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ABSTRACT

Early Head Start was designed in 1994 as a 2-generation program to enhance children's development and health, strengthen family and community partnerships, and support the staff delivering new services to low-income families with pregnant women, infants, or toddlers. This document contains the final technical report, appendixes, and local contributions to understanding the programs and their impacts. The final technical report examines the impact of Early Head Start on 3,001 families from 17 research programs from all U.S. regions in both rural and urban settings. A consistent pattern of statistically significant, modest, favorable impacts across a range of outcomes when children were 2 and 3 years old, with larger impacts in several subgroups was found. There was evidence that effects on children when they were 3 years old were associated with effects on parenting when children were 2. The impact findings suggest several lessons for programs, including the importance of the performance standards and the need to see new or alternative strategies for families with many risk factors. The second part of this document includes the appendices for the technical report. The appendixes acknowledge the contributions of individuals and organizations in conducting the study over 6 years and present information on the methods for data collection, sources of nonresponse, and the father study response rates; provide supplementary information on measures used in the evaluation for the

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impact and implementation analyses; describe details of analyses conducted to test assumptions underlying the analytic approach taken in the assessment of Early Head Start's impact on children and families; and present supplemental data tables. The third part of this document contains brief write-ups of 21 site-specific local research studies from 9 of the local research teams and from staff in 2 of the programs. The write-ups cover topics such as parent responsiveness and children's developmental outcomes; mothers' socialization of toddler conflict resolution; coping strategies of low-income mothers; functions of language use in mother-toddler communication; father-child interactions; a pattern of Early Head Start participation; and Early Head Start support of families in obtaining services for children with disabilities. Each write-up contains references. (KB)

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EARLY HEAD START

RESEARCH

Making a Difference in the Lives of Infants and Toddlers and Their Families: The Impacts of Early Head Start

Volume I: Final Technical Report

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U.S. Department of Health and Human Services
Administration for Children and Families
Office of Planning, Research and Evaluation
Child Outcomes Research and Evaluation
Administration on Children, Youth and Families
Head Start Bureau

Early Head Start
Research and Evaluation Project
Local—National Partnerships

Making a Difference in the Lives of Infants and Toddlers and Their Families: The Impacts of Early Head Start

Volume I: Final Technical Report

June 2002

Child Outcomes Research and Evaluation
Office of Planning, Research, and Evaluation
Administration for Children and Families
And the Head Start Bureau
Administration on Children, Youth and Families
Department of Health and Human Services

Early Head Start Evaluation Reports

Leading the Way: *Describes the characteristics and implementation levels of 17 Early Head Start programs in fall 1997, soon after they began serving families.*

Executive Summary (December 2000): *Summarizes Volumes I, II, and III.*

Volume I (December 1999): *Cross-Site Perspectives—Describes the characteristics of Early Head Start research programs in fall 1997, across 17 sites.*

Volume II (December 1999): *Program Profiles—Presents the stories of each of the Early Head Start research programs.*

Volume III (December 2000): *Program Implementation—Describes and analyzes the extent to which the programs fully implemented, as specified in the Revised Head Start Program Performance Standards, as of fall 1997.*

Pathways to Quality and Full Implementation (spring 2002): *Describes and analyzes the characteristics, levels of implementation, and levels of quality of the 17 Early Head Start programs in fall 1999, three years into serving families. Presents an analysis of the pathways programs followed to achieve full implementation and high quality.*

Building Their Futures: How Early Head Start Programs Are Enhancing the Lives of Infants and Toddlers in Low-Income Families: *Presents analysis of the impacts that the research programs have had on children's development, parenting, and family development through 2 years of age.*

Summary Report (January 2001): *Synopsis of the major findings.*

Technical Report (June 2001): *Detailed findings and report on methodology and analytic approaches.*

Special Policy Report on Child Care in Early Head Start (summer 2002): *Describes the nature, types, and quality of child care arrangements in which Early Head Start and control group children enrolled, and presents implications for public policy.*

Special Policy Report on Children's Health in Early Head Start (summer 2002): *Describes health services received by Early Head Start and control group families.*

Making a Difference in the Lives of Infants and Toddlers and Their Families: The Impacts of Early Head Start (June 2002): *Presents analysis of the impacts that the research programs have had on children's development, parenting, and family development through the children's third birthday (including two to three years of program participation).*

Reports Are Available at:

http://www.acf.dhhs.gov/programs/core/ongoing_research/ehs/ehs_intro.html

http://www.mathematica-mpr.com/3rdLevel/ehstoc.htm

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This report comes at the conclusion of almost seven years of work, which had its roots even earlier in the vision of the Advisory Committee on Services for Families with Infants and Toddlers. During this time, some 3,000 Early Head Start and control group families put up with our phone calls, visits in their homes, lengthy interviews, video cameras, and child assessment materials. Moreover, this research would not have been possible without the dedication, cooperation, patience—and even enthusiasm—of 17 Early Head Start program directors and their staffs who participated in this research in many ways. The local and national research teams are most grateful to the Early Head Start programs for their role in making the study possible. The tangible incentives we were able to offer were small, but we hope both the programs and the families felt like important contributors to the growing knowledge base of Early Head Start research.

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7

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CONTENTS

Chapter | Page

EXECUTIVE SUMMARY xxiii

I INTRODUCTION: BACKGROUND AND CONTEXT FOR THE EVALUATION 1

A. OVERVIEW OF THE FINDINGS 2

B. EARLY HEAD START, ITS HISTORY, AND ITS DEVELOPMENT AS A NATIONAL PROGRAM 4

1. The Role of Legislation and Advisory Committees 5
2. The National Early Head Start Program 8
3. The Program's Policy Context 9
4. The Research Context for the Early Head Start Program and Its Evaluation 10

C. RESEARCH QUESTIONS ADDRESSED IN THE EARLY HEAD START IMPACT STUDY 16

1. Central Questions of the Study 16
2. Conceptual Framework 17
3. Overarching Hypotheses 18

D. THE EARLY HEAD START PROGRAMS, FAMILIES, AND COMMUNITIES 20

1. The 17 Early Head Start Research Programs 21
2. The Families That Early Head Start Research Programs Served 25
3. The Communities Served by Early Head Start Research Programs 28
4. How Early Head Start Research Programs Compare with All Funded Programs from Which They Were Selected 29

E. OVERVIEW OF THE EVALUATION 31

1. Description of the Evaluation 31
2. The Early Head Start Research Consortium 32
3. Overview of the Implementation Study and Its Findings 32

Chapter **Page**

II EVALUATION DESIGN, DATA, AND ANALYTIC APPROACHES 37

A. STUDY DESIGN 37

1. Site Selection 37
2. Sample Enrollment 38
3. Random Assignment 39

B. DATA SOURCES AND OUTCOME MEASURES 42

1. Data Sources 42
2. Response Rates 45
3. Timing of Interviews 54
4. Outcome Variables 55
5. Analysis Samples 58

C. ANALYTIC APPROACHES 59

1. Global Analysis 59
2. Targeted Analysis 71
3. Criteria for Identifying Program Effects 94

III PARTICIPATION IN EARLY HEAD START SERVICES 97

A. DATA SOURCES 97

B. LEVELS OF OVERALL PARTICIPATION IN PROGRAM SERVICES 99

C. DURATION OF PROGRAM PARTICIPATION 100

D. LEVELS OF PARTICIPATION IN CORE CHILD DEVELOPMENT SERVICES 102

1. Early Head Start Home Visits 104
2. Early Head Start Center-Based Child Care 108

E. USE OF CHILD CARE SERVICES 114

F. RECEIPT OF OTHER CHILD DEVELOPMENT SERVICES 122

1. Parenting Education and Parent-Child Group Socializations 122
2. Child Health Services 125
3. Services for Children with Disabilities 127

Chapter **Page**

III *(continued)*

G. FAMILY DEVELOPMENT SERVICES 132

1. Case Management 132
2. Family Health Care 133
3. Family Mental Health Care 133
4. Other Family Development Services 136

H. ENGAGEMENT IN PROGRAM SERVICES 136

I. SUMMARY AND CONCLUSIONS 140

IV EARLY HEAD START IMPACTS ON SERVICE RECEIPT 145

A. GLOBAL IMPACTS ON SERVICE RECEIPT AND SERVICE INTENSITY 146

1. Impacts on the Receipt of Core Child Development Services 147
2. Impacts on Receipt of Other Child Development Services 156
3. Impacts on Receipt of Family Development Services 166

B. DIFFERENCES IN PROGRAM IMPACTS ON RECEIPT OF SERVICES ACROSS SUBGROUPS OF PROGRAMS 171

1. Difference in Impacts on Service Receipt by Program Approach 173
2. Differences in Program Impacts on Service Receipt by Implementation Status 177

C. IMPLICATIONS FOR CHILD AND FAMILY OUTCOMES 188

V EARLY HEAD START PROGRAMS' OVERALL IMPACTS ON CHILDREN'S DEVELOPMENT, PARENTING, AND FAMILY WELL-BEING 191

A. HYPOTHESES AND BRIEF SUMMARY OF FINDINGS 193

B. OUTCOME MEASURES USED AT AGE 3 194

1. Child Development Measures 195
2. Parenting and Home Environment Measures 196
3. Measures of Parent Health and Mental Health, Family Functioning, and Self-Sufficiency 196
4. Data Sources for Child, Parent, and Family Measures 197

Chapter **Page**

V *(continued)*
C. OVERALL IMPACTS ON CHILDREN'S DEVELOPMENT 197
  1. Overall Impacts on Cognitive and Language Development 197
  2. Overall Impacts on Children's Social-Emotional Development 199

D. OVERALL IMPACTS ON PARENTING 208
  1. Parenting Behavior and the Home Environment 208
  2. Parenting Knowledge 217
  3. Summary of Impacts on Parenting 222

E. OVERALL IMPACTS ON FAMILY WELL-BEING 223
  1. Parents' Health and Mental Health and Family Functioning 223
  2. Economic Self-Sufficiency 224

F. HOW IMPACTS ON PARENTING AT AGE 2 MAY HAVE INFLUENCED CHILD OUTCOMES AT AGE 3 234
  1. Mediators of Cognitive and Language Development 240
  2. Mediators of Child Engagement of Parent and Sustained Attention to Objects 242
  3. Mediators of Negative Aspects of Children's Social-Emotional Development 243
  4. Synopsis of Estimates from the Mediated Analyses 244

G. FATHERHOOD RESEARCH AND LOCAL RESEARCH CONTRIBUTIONS 244

H. CONCLUSIONS 250

VI VARIATIONS IN IMPACTS BY PROGRAM APPROACH AND PATTERN OF IMPLEMENTING KEY FEATURES OF THE PERFORMANCE STANDARDS .. 265

A. HOW CHILD DEVELOPMENT, PARENTING, AND FAMILY WELL-BEING IMPACTS VARIED BY PROGRAM APPROACH 267
  1. Child Development 269
  2. Parenting 274
  3. Parents' Physical and Mental Health and Self-Sufficiency 278

12

Chapter **Page**

VI *(continued)*

4. Exploring the Relationships Between Parenting Impacts When Children Were 2 and Child Impacts When Children Were 3 by Program Approach 284
5. Understanding Program Services and Their Impacts 286

B. HOW CHILD DEVELOPMENT, PARENTING, AND FAMILY WELL-BEING IMPACTS VARIED BY PATTERNS OF IMPLEMENTATION 287

1. Child Development 290
2. Parenting 294
3. Parent Mental Health and Self-Sufficiency 298
4. The Importance of Implementation 300

C. SUMMARY AND CONCLUSIONS 315

VII DIFFERENTIAL EFFECTS OF EARLY HEAD START PROGRAMS ON CHILDREN AND FAMILIES WITH DIFFERENT CHARACTERISTICS 319

A. IMPORTANT VARIATIONS IN PROGRAM IMPACTS FOR CHILDREN AND FAMILIES WITH DIFFERENT CHARACTERISTICS 321

1. Guiding Hypotheses 321
2. Approach to Estimating and Interpreting Subgroup Impacts 326
3. Variations in Impacts By Mother's Pregnancy Status at Enrollment 327
4. Variations by Child's Birth Order 330
5. Variations in Impacts Among Teenage and Older Mothers 332
6. Variations in Impacts by Race/Ethnicity and Language 335
7. Variations in Impacts By Number of Demographic Risk Factors 341
8. Variations in Impacts By Mothers' Mental Health Status 344
9. Other Subgroups Examined 347

B. THE IMPORTANCE OF PARTICULAR SUBGROUP FINDINGS FOR PROGRAMS AND POLICY 348

1. Working With Teenage Parents and Their Children 349
2. Engaging Depressed Mothers 352
3. Working with High-Risk Families 354

C. CONCLUSIONS AND IMPLICATIONS 356

CONTENTS *(continued)*

Chapter **Page**

VIII SUMMARY AND RECOMMENDATIONS 413

- A. KEY FINDINGS FROM THE ANALYSIS OF EARLY HEAD START IMPACTS 413
- B. RECOMMENDATIONS FOR PROGRAMS, POLICY, AND RESEARCH 419
- C. NEXT STEPS 422

REFERENCES 423

VOLUME II: FINAL TECHNICAL REPORT APPENDIXES

- APPENDIX A: ACKNOWLEDGMENTS
- APPENDIX B: DATA COLLECTION, SOURCES OF NONRESPONSE, AND FATHER STUDY RESPONSE RATES
- APPENDIX C: OUTCOME MEASURES, PSYCHOMETRICS, AND IMPLEMENTATION MEASURES
- APPENDIX D: ANALYTIC ISSUES AND DETAILS
- APPENDIX E: SUPPLEMENTAL TABLES BY CHAPTER

VOLUME III: LOCAL CONTRIBUTIONS TO UNDERSTANDING THE PROGRAMS AND THEIR IMPACTS

TABLES

Table Page

I.1 KEY CHARACTERISTICS OF FAMILIES ENTERING THE EARLY HEAD START RESEARCH PROGRAMS 26

I.2 COMPARISON OF RESEARCH PROGRAMS AND WAVE I AND II PROGRAMS 30

II.1 EVALUATION SAMPLE SIZES, BY SITE AND RESEARCH STATUS 41

II.2 RESPONSE RATES TO KEY DATA SOURCES 46

II.3 RESPONSE RATES TO THE 26-MONTH PSI, 36-MONTH PI AND 36-MONTH ASSESSMENTS, BY SITE 49

II.4 RESPONSE RATES TO THE 26-MONTH PSI, 36-MONTH PI AND 36-MONTH ASSESSMENTS, BY SUBGROUPS DEFINED BY SITE AND FAMILY CHARACTERISTICS 51

II.5 CATEGORIES OF OUTCOME VARIABLES AND THEIR DATA SOURCES 56

II.6 CATEGORIES OF EXPLANATORY VARIABLES FOR REGRESSIONS 62

II.7 SUBGROUPS DEFINED BY PROGRAM APPROACH, IMPLEMENTATION LEVEL, AND COMMUNITY CONTEXT 73

II.8 SUBGROUPS DEFINED BY SITE CHARACTERISTICS, BY SITE 74

II.9 KEY FAMILY, PARENT, AND CHILD CHARACTERISTICS AT BASELINE, BY PROGRAM APPROACH 79

II.10 SUBGROUPS DEFINED BY FAMILY AND CHILD CHARACTERISTICS AT BASELINE 82

III.1 DURATION OF EARLY HEAD START PARTICIPATION BY PROGRAM FAMILIES, FOR THE FULL SAMPLE AND KEY PROGRAM SUBGROUPS 101

III.2 LEVELS OF PARTICIPATION IN CORE EARLY HEAD START CHILD DEVELOPMENT SERVICES, FOR THE FULL SAMPLE AND KEY PROGRAM SUBGROUPS 103

TABLES ***(continued)***

Table **Page**

III.3 LEVELS OF PARTICIPATION IN EARLY HEAD START HOME VISITS, FOR THE FULL SAMPLE AND KEY PROGRAM SUBGROUPS 106

III.4 LEVELS OF PARTICIPATION IN EARLY HEAD START CENTER-BASED CHILD CARE, FOR THE FULL SAMPLE AND KEY PROGRAM SUBGROUPS 111

III.5 CHILD CARE ARRANGEMENTS USED BY EARLY HEAD START FAMILIES, FOR THE FULL SAMPLE AND KEY PROGRAM SUBGROUPS 115

III.6 INTENSITY OF CHILD CARE USE BY EARLY HEAD START FAMILIES, FOR THE FULL SAMPLE AND KEY PROGRAM SUBGROUPS 118

III.7 OUT-OF-POCKET CHILD CARE EXPENSES AND RECEIPT OF CHILD CARE SUBSIDIES, FOR THE FULL SAMPLE OF EARLY HEAD START FAMILIES AND KEY PROGRAM SUBGROUPS........ 121

III.8 LEVELS OF PARTICIPATION IN PARENTING EDUCATION SERVICES AND PARENT-CHILD GROUP SOCIALIZATION ACTIVITIES, FOR THE FULL SAMPLE OF EARLY HEAD START FAMILIES AND KEY PROGRAM SUBGROUPS........ 123

III.9 RECEIPT OF CHILD HEALTH SERVICES BY EARLY HEAD START CHILDREN, FOR THE FULL SAMPLE AND KEY PROGRAM SUBGROUPS 126

III.10 DISABILITY INDICATORS AND RECEIPT OF EARLY INTERVENTION SERVICES BY EARLY HEAD START CHILDREN, FOR THE FULL SAMPLE AND KEY PROGRAM SUBGROUPS 129

III.11 RECEIPT OF CASE MANAGEMENT SERVICES BY EARLY HEAD START FAMILIES, FOR THE FULL SAMPLE AND KEY PROGRAM SUBGROUPS 134

III.12 RECEIPT OF FAMILY HEALTH CARE SERVICESa BY EARLY HEAD START FAMILIES, FOR THE FULL SAMPLE AND KEY PROGRAM SUBGROUPS 135

III.13 RECEIPT OF FAMILY DEVELOPMENT SERVICES BY EARLY HEAD START FAMILIES, FOR THE FULL SAMPLE AND KEY PROGRAM SUBGROUPS 137

TABLES *(continued)*

Table		Page
III.14	PROGRAM FAMILIES' ENGAGEMENT IN EARLY HEAD START SERVICES FOR THE FULL SAMPLE AND KEY PROGRAM SUBGROUPS	139
IV.1	IMPACTS ON OUT-OF-POCKET CHILD CARE COSTS AND USE OF CHILD CARE SUBSIDIES DURING THE 26-MONTH FOLLOW-UP PERIOD	155
IV.2	IMPACTS ON RECEIPT OF CHILD HEALTH SERVICES AND CHILD HEALTH OUTCOMES DURING THE COMBINED FOLLOW-UP PERIOD	163
IV.3	IMPACTS ON FAMILY HEALTH CARE SERVICES AND HEALTH STATUS DURING THE COMBINED FOLLOW-UP PERIOD	170
V.1	IMPACTS ON CHILD COGNITIVE AND LANGUAGE DEVELOPMENT	201
V.2	IMPACTS ON POSITIVE ASPECTS OF CHILD SOCIAL-EMOTIONAL DEVELOPMENT	203
V.3	IMPACTS ON NEGATIVE ASPECTS OF CHILD SOCIAL-EMOTIONAL DEVELOPMENT	207
V.4	IMPACTS ON EMOTIONALLY SUPPORTIVE PARENTING	211
V.5	IMPACTS ON THE HOME ENVIRONMENT AND PARENT STIMULATION OF LANGUAGE AND LEARNING	215
V.6	IMPACTS ON NEGATIVE ASPECTS OF PARENTING BEHAVIOR	219
V.7	IMPACTS ON PARENTING KNOWLEDGE: SAFETY AND DISCIPLINE STRATEGIES	221
V.8	IMPACTS ON PARENT HEALTH, MENTAL HEALTH, AND FAMILY FUNCTIONING	227
V.9	IMPACTS ON SELF-SUFFICIENCY ACTIVITIES	229
V.10	IMPACTS ON EDUCATION ACTIVITIES AND CREDENTIALS	232
V.11	IMPACTS ON WELFARE PROGRAM PARTICIPATION	235
V.12	IMPACTS ON FAMILY INCOME, RESOURCES, AND SUBSEQUENT CHILDBEARING	237

Table		Page
V.13	ESTIMATED MEDIATING EFFECTS OF PARENTING IMPACTS AT AGE 2 ON EARLY HEAD START IMPACTS ON CHILD DEVELOPMENT AT AGE 3	241
VI.1	IMPACTS ON CHILD OUTCOMES AT AGE 3, BY PROGRAM APPROACH	270
VI.2	IMPACTS ON PARENTING OUTCOMES AT AGE 3, BY PROGRAM APPROACH	275
VI.3	IMPACTS ON PARENT PHYSICAL AND MENTAL HEALTH AT THE 36-MONTH ASSESSMENT, BY PROGRAM APPROACH	279
VI.4	IMPACTS ON SELF-SUFFICIENCY AT 28 MONTHS, BY PROGRAM APPROACH IN 1997	281
VI.5	IMPACTS ON CHILD OUTCOMES AT AGE 3, BY PATTERN OF PROGRAM IMPLEMENTATION	291
VI.6	IMPACTS ON PARENTING OUTCOMES AT AGE 3, BY PATTERN OF PROGRAM IMPLEMENTATION	295
VI.7	IMPACTS ON PARENT PHYSICAL AND MENTAL HEALTH AT THE 36-MONTH ASSESSMENT, BY PATTERN OF PROGRAM IMPLEMENTATION	299
VI.8	IMPACTS ON SELF-SUFFICIENCY, BY PATTERN OF IMPLEMENTATION	301
VI.9	IMPACTS ON CHILD AND FAMILY OUTCOMES AT AGE 3, BY IMPLEMENTATION STATUS FOR HOME-BASED PROGRAMS	304
VI.10	IMPACTS ON SELF-SUFFICIENCY AT 28 MONTHS, BY IMPLEMENTATION STATUS FOR HOME- BASED PROGRAMS	307
VI.11	IMPACTS ON CHILD AND FAMILY OUTCOMES AT AGE 3, BY IMPLEMENTATION STATUS OF MIXED APPROACH PROGRAMS	310
VI.12	IMPACTS ON SELF-SUFFICIENCY AT 28 MONTHS, BY IMPLEMENTATION STATUS OF MIXED APPROACH PROGRAMS	313
VII.1	IMPACTS ON SERVICE RECEIPT DURING THE FIRST 28 MONTHS, BY PREGNANCY STATUS AT ENROLLMENT	358
VII.2	IMPACTS ON CHILD AND FAMILY OUTCOMES AT AGE 3, BY PREGNANCY STATUS AT ENROLLMENT	360

TABLES *(continued)*

Table **Page**

VII.3 IMPACTS ON SELF-SUFFICIENCY AT 28 MONTHS, BY PREGNANCY STATUS AT ENROLLMENT 363

VII.4 IMPACTS ON SERVICE RECEIPT DURING THE FIRST 28 MONTHS, BY FOCUS CHILD'S BIRTH ORDER 365

VII.5 IMPACTS ON CHILD AND FAMILY OUTCOMES AT AGE 3, BY FOCUS CHILD'S BIRTH ORDER 367

VII.6 IMPACTS ON SELF-SUFFICIENCY AT 28 MONTHS, BY FOCUS CHILD'S BIRTH ORDER 370

VII.7 IMPACTS ON SERVICE RECEIPT DURING THE FIRST 28 MONTHS, BY AGE OF MOTHER AT BIRTH OF FOCUS CHILD 372

VII.8 IMPACTS ON CHILD AND FAMILY OUTCOMES AT AGE 3, BY AGE OF MOTHER AT BIRTH OF FOCUS CHILD 374

VII.9 IMPACTS ON SELF-SUFFICIENCY AT 28 MONTHS, BY AGE OF MOTHER AT BIRTH OF FOCUS CHILD 377

VII.10 IMPACTS ON SERVICE RECEIPT DURING THE FIRST 28 MONTHS, BY RACE/ETHNICITY 379

VII.11 IMPACTS ON CHILD AND FAMILY OUTCOMES AT AGE 3, BY RACE/ETHNICITY 381

VII.12 IMPACTS ON SELF-SUFFICIENCY AT 28 MONTHS, BY RACE/ETHNICITY 386

VII.13 IMPACTS ON SERVICE RECEIPT DURING THE FIRST 28 MONTHS, BY MAIN LANGUAGE SPOKEN AT HOME 389

VII.14 IMPACTS ON CHILD AND FAMILY OUTCOMES AT AGE 3, BY MAIN LANGUAGE SPOKEN AT HOME 391

VII.15 IMPACTS ON SELF-SUFFICIENCY AT 28 MONTHS, BY MAIN LANGUAGE SPOKEN AT HOME 394

VII.16 IMPACTS ON SERVICE RECEIPT DURING THE FIRST 28 MONTHS, BY NUMBER OF MATERNAL RISK FACTORS 396

VII.17 IMPACTS ON CHILD AND FAMILY OUTCOMES AT AGE 3, BY NUMBER OF MATERNAL RISK FACTORS 398

VII.18 IMPACTS ON SELF-SUFFICIENCY AT 28 MONTHS, BY NUMBER OF MATERNAL RISK FACTORS 403

Table **Page**

VII.19 IMPACTS ON SERVICE RECEIPT DURING THE FIRST 28 MONTHS, BY MOTHER'S RISK OF DEPRESSION AT ENROLLMENT 406

VII.20 IMPACTS ON CHILD AND FAMILY OUTCOMES AT AGE 3, BY MOTHER'S RISK OF DEPRESSION AT ENROLLMENT 408

VII.21 IMPACTS ON SELF-SUFFICIENCY AT 28 MONTHS, BY MOTHER'S RISK OF DEPRESSION AT ENROLLMENT 411

FIGURES

Figure **Page**

I.1 KEY EVENTS IN THE HISTORY OF EARLY HEAD START 6

I.2 THE EVOLUTION OF PROGRAM APPROACHES OVER TIME 23

IV.1 IMPACTS ON RECEIPT OF CORE CHILD DEVELOPMENT SERVICES DURING THE COMBINED FOLLOW-UP PERIOD 148

IV.2 IMPACTS ON RECEIPT OF HOME VISITS DURING THE COMBINED FOLLOW-UP PERIOD 150

IV.3 IMPACTS ON RECEIPT OF CHILD CARE DURING THE 26-MONTH FOLLOW-UP PERIOD 152

IV.4 IMPACTS ON HOURS OF CHILD CARE USED DURING THE 26-MONTH FOLLOW-UP PERIOD 154

IV.5 IMPACTS ON RECEIPT OF PARENTING EDUCATION SERVICES DURING THE COMBINED FOLLOW-UP PERIOD 157

IV.6 IMPACTS ON EARLY INTERVENTION SERVICES DURING THE COMBINED FOLLOW-UP PERIOD 165

IV.7 IMPACTS ON RECEIPT OF CASE MANAGEMENT SERVICES DURING THE COMBINED FOLLOW-UP PERIOD 169

IV.8 IMPACTS ON RECEIPT OF FAMILY DEVELOPMENT SERVICES DURING THE COMBINED FOLLOW-UP PERIOD 172

IV.9 SELECTED IMPACTS ON SERVICE RECEIPT BY PROGRAM APPROACH 175

IV.10 SELECTED IMPACTS ON SERVICE RECEIPT BY IMPLEMENTATION STATUS 178

IV.11 SELECTED IMPACTS ON SERVICE RECEIPT FOR MIXED-APPROACH PROGRAMS BY IMPLEMENTATION STATUS 183

IV.12 SELECTED IMPACTS ON SERVICE RECEIPT FOR HOME-BASED PROGRAMS BY IMPLEMENTATION STATUS 186

21

Figure **Page**

V.1 IMPACTS ON ANY SELF-SUFFICIENCY ACTIVITY, BY QUARTER 230

V.2 IMPACTS ON PARTICIPATION IN EDUCATION AND TRAINING PROGRAMS, BY QUARTER 231

V.3 IMPACTS ON EMPLOYMENT RATES, BY QUARTER 233

V.4 IMPACTS ON AFDC/TANF RECEIPT, BY QUARTER 236

V.5 IMPACTS ON SUBSEQUENT BIRTHS, BY QUARTER 238

BOXES

Box		Page
III.1	PATTERNS OF PARTICIPATION IN HOME-BASED SERVICES	109
III.2	RELATIONS AMONG MOTHER AND HOME VISITOR PERSONALITY TRAITS, RELATIONSHIP QUALITY, AND AMOUNT OF TIME SPENT IN HOME VISITS	110
III.3	PARENTS' PERCEPTIONS OF TRAINING AND SERVICE ACTIVITIES REGARDING THEIR CHILD'S NURTURING AND DEVELOPMENT: IMPLEMENTATION AND BENEFITS OF EARLY HEAD START	124
III.4	OPPORTUNITIES AND CHALLENGES IN PROVIDING SERVICES TO CHILDREN WITH DISABILITIES WITHIN EARLY HEAD START	128
III.5	THE CHILD'S EXPERIENCE IN A MONTESSORI EARLY HEAD START PROGRAM	141
III.6	PREDICTORS OF PROGRAM PARTICIPATION AT THE EDUCATIONAL ALLIANCE'S EARLY HEAD START	142
IV.1	FATHER PARTICIPATION IN PROGRAM-RELATED ACTIVITIES	158
IV.2	EARLY HEAD START SUPPORTS FAMILIES IN OBTAINING SERVICES FOR YOUNG CHILDREN WITH DISABILITIES	167
V.1	MEASURES OF COGNITIVE AND LANGUAGE DEVELOPMENT	200
V.2	MEASURES OF POSITIVE ASPECTS OF CHILD SOCIAL-EMOTIONAL DEVELOPMENT	202
V.3	MEASURES OF NEGATIVE ASPECTS OF CHILD SOCIAL-EMOTIONAL DEVELOPMENT	206
V.4	MEASURES OF EMOTIONALLY SUPPORTIVE PARENTING	210
V.5	MEASURES OF THE HOME ENVIRONMENT AND PARENT STIMULATION OF LANGUAGE AND LEARNING	214
V.6	MEASURES OF NEGATIVE ASPECTS OF PARENTING BEHAVIOR	218
V.7	MEASURES OF PARENTING KNOWLEDGE ABOUT SAFETY AND DISCIPLINE STRATEGIES	220
V.8	MEASURES OF THE PARENT'S HEALTH, MENTAL HEALTH, AND FAMILY FUNCTIONING	226

BOXES ***(continued)***

Box **Page**

V.9 MEASURES OF ECONOMIC SELF-SUFFICIENCY 228

V.10 FATHERS AND FATHER FIGURES IN THE LIVES OF EARLY HEAD START CHILDREN 245

V.11 HOW MUCH BETTER THAN EXPECTED? IMPROVING COGNITIVE OUTCOMES IN UTAH'S BEAR RIVER EARLY HEAD START 252

V.12 MOTHER-CHILD LANGUAGE AT 14 AND 24 MONTHS: CONCURRENT AND LAGGED ASSOCIATIONS 253

V.13 FUNCTIONS OF LANGUAGE USE IN MOTHER-TODDLER COMMUNICATION 254

V.14 PARENT RESPONSIVENESS AND CHILDREN'S DEVELOPMENTAL OUTCOMES 255

V.15 OUTCOMES OF PROGRAM PARTICIPATION AND CORRELATES OF CHILDREN'S COGNITIVE DEVELOPMENT AT THE EDUCATIONAL ALLIANCE'S EARLY HEAD START 256

V.16 RELATIONS BETWEEN SPECIFIC AND GLOBAL FEATURES OF MOTHER-CHILD INTERACTIONS AND LANGUAGE 257

V.17 SYNOPSIS OF MOTHERS' SOCIALIZATION OF TODDLER CONFLICT RESOLUTION 258

V.18 CHANGE IN PARENT-CHILD INTERACTION IN LOW-INCOME FAMILIES: LINKS TO FATHER STATUS 259

V.19 FATHER-CHILD INTERACTIONS: MEASURING PAST PATERNAL INFLUENCES 260

V.20 ANDREYA EARNS HER HIGH SCHOOL DEGREE: THE ROLE OF EARLY HEAD START 261

V.21 VALIDATION OF NATIONAL CHILD LANGUAGE MEASURES AT 14 AND 24 MONTHS 262

V.22 ASSOCIATIONS OF MATERNAL AND CHILD ATTACHMENT SECURITY WITH OUTCOMES OF CHILDREN ELIGIBLE FOR EARLY HEAD START 263

V.23 EARLY HEAD START INTERVENTION WITH FAMILIES AND FAMILIES' INVESTMENT IN CHILDREN 264

EXECUTIVE SUMMARY

EARLY HEAD START AND ITS EARLY DEVELOPMENT IN BRIEF

Following the recommendations of the Secretary's Advisory Committee on Services for Families with Infants and Toddlers in 1994, the Administration on Children, Youth and Families (ACYF) designed Early Head Start as a two-generation program to enhance children's development and health, strengthen family and community partnerships, and support the staff delivering new services to low-income families with pregnant women, infants, or toddlers. In 1995 and 1996, ACYF funded the first 143 programs, revised the Head Start Program Performance Standards to bring Early Head Start under the Head Start umbrella, created an ongoing national system of training and technical assistance (provided by the Early Head Start National Resource Center in coordination with ACYF's regional offices and training centers), and began conducting regular program monitoring to ensure compliance with the performance standards.[1] Today, the program operates in 664 communities and serves some 55,000 children.

At the same time, ACYF selected 17 programs from across the country to participate in a rigorous, large-scale, random-assignment evaluation.[2] The Early Head Start evaluation was designed to carry out the recommendation of the Advisory Committee on Services for Families with Infants and Toddlers for a strong research and evaluation component to support continuous improvement within the Early Head Start program and to meet the requirement in the 1994 and 1998 reauthorizations for a national evaluation of the new infant-toddler program. The research programs include all the major program approaches and are located in all regions of the country and in urban and rural settings. The families they serve are highly diverse. Their purposeful selection resulted in a research sample (17 programs and 3,001 families) that reflects the characteristics of all programs funded in 1995 and 1996, including their program approaches and family demographic characteristics.

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[1] The revised Head Start Program Performance Standards were published in the *Federal Register* for public comment in November 1996 and became effective in January 1998.

[2] From among 41 Early Head Start programs that applied with local research partners to be research sites, ACYF selected 15 to achieve a balance of rural and urban locations, racial/ethnic composition, and program approaches from among those that could recruit twice as many families as they could serve, taking into consideration the viability of the proposed local research. Subsequently, ACYF added two sites to provide the desired balance of approaches.

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EARLY HEAD START PROGRAMS AND SERVICES

Early Head Start grantees are charged with tailoring their program services to meet the needs of low-income pregnant women and families with infants and toddlers in their communities and may select among program options specified in the performance standards (home-based, center-based, combination, and locally designed options). Grantees are required to provide child development services, build family and community partnerships, and support staff to provide high-quality services for children and families. Early Head Start programs may select from a variety of approaches to enhance child development directly and to support child development through parenting and/or family development services.

For purposes of the research, the 17 research programs were characterized according to the options they offer *families* as (1) *center-based,* providing all services to families through center-based child care and education, parent education, and a minimum of two home visits per year to each family; (2) *home-based,* providing all services to families through weekly home visits and at least two group socializations per month for each family; or (3) *mixed approach,* a diverse group of programs providing center-based services to some families, home-based services to other families, or a mixture of center-based and home-based services.[3] When initially funded, the 17 research programs were about equally divided among the three program approaches. However, by fall 1997, seven had adopted a home-based approach, four were center-based, and six were mixed-approach programs.[4]

The structure of Early Head Start programs was influenced during the first five years by a number of changes occurring in their communities and states. Families' needs changed as parents entered the workforce or undertook education and training activities in response to welfare reform or job opportunities created by favorable economic conditions. The resources for early childhood services also increased due in part to strong local economies. Meanwhile, state and community health initiatives created new access to services for all low-income families, and the federal Fatherhood Initiative heightened attention to issues of father involvement.

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[3] Services can be mixed in several ways to meet families' needs: programs may target different types of services to different families, or they may provide individual families with a mix of services, either at the same time or at different times. Mixed programs are able to fine tune center-based and home-based services within a single program to meet family needs. A locally designed option (an official option that allows for creative program-specific services) could be classified as mixed if it included both home- and center-based services; however, there were no locally designed option programs among the research programs.

[4] Programs have continued to evolve and refine their service strategies to meet changing needs of families. See the Early Head Start implementation report, *Pathways to Quality,* for a full description of programs' development. By fall 1999, 2 programs offered home-based services exclusively, 4 continued to provide center-based services exclusively, and 11 had become mixed-approach programs.

EARLY HEAD START HAD POSITIVE IMPACTS ON OUTCOMES FOR LOW-INCOME FAMILIES WITH INFANTS AND TODDLERS

The Early Head Start research programs stimulated better outcomes along a range of dimensions (with children, parents, and home environments) by the time children's eligibility ended at age 3.[5] Overall impacts were modest, with effect sizes in the 10 to 20 percent range, although impacts were considerably larger for some subgroups, with some effect sizes in the 20 to 50 percent range. The overall pattern of favorable impacts is promising, particularly since some of the outcomes that the programs improved are important predictors of later school achievement and family functioning.

- For 3-year-old children, Early Head Start programs largely sustained the statistically significant, positive impacts on cognitive development that had been found at age 2. Early Head Start children scored higher, on average, on a standardized assessment of cognitive development, the Bayley Scales of Infant Development Mental Development Index (MDI; mean of 91.4 for the Early Head Start group vs. 89.9 for the control group). In addition, a smaller percentage of Early Head Start children (27.3 vs. 32.0 percent) scored in the at-risk range of developmental functioning (below 85 on the Bayley MDI). By moving children out of the lowest functioning group, early Head Start may be reducing their risk of poor cognitive and school outcomes later on. However, it is important to note that although the Early Head Start children scored significantly higher than their control group peers, they continued to score below the mean of the national norms (a score of 100).
- Early Head Start also sustained significant impacts found on language development from age 2 to age 3. At 3, Early Head Start children scored higher on a standardized assessment of receptive language, the Peabody Picture Vocabulary Test (PPVT-III; 83.3 for the Early Head Start group vs. 81.1 for the program group). In addition, significantly fewer program (51.1 vs. 57.1 percent) children scored in the at-risk range of developmental functioning. Early Head Start children are still scoring well below national norms (mean score of 100), although they are scoring higher than children in the control group.
- Early Head Start programs had favorable impacts on several aspects of social-emotional development at age 3 (more than at age 2). Early Head Start children were observed to engage their parents more, were less negative to their parents, and were more attentive to objects during play, and Early Head Start children were rated lower in aggressive behavior by their parents than control children.

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[5] Table 1 (attached) shows the 3-year-old average impacts for the major outcomes measured in the evaluation, along with the impacts found at age 2, as reported in the study's interim report, *Building Their Futures* (Administration on Children, Youth and Families 2001).

- When children were 3, Early Head Start programs continued to have significant favorable impacts on a wide range of parenting outcomes. Early Head Start parents were observed to be more emotionally supportive, and had significantly higher scores than control parents had on a commonly used measure of the home environment, the Home Observation for Measurement of the Environment (HOME). Early Head Start parents provided significantly more support for language and learning than control-group parents as measured by a subscale of the HOME. Early Head Start parents were also more likely to report reading daily to their child (56.8 versus 52.0 percent). They were *less* likely than control-group parents to engage in negative parenting behaviors. Early Head Start parents were less detached than control group parents, and 46.7 percent of Early Head Start parents reported that they spanked their children in the past week, compared with 53.8 percent of control group parents. Early Head Start parents reported a greater repertoire of discipline strategies, including more mild and fewer punitive strategies.

- Early Head Start programs had some impacts on parents' progress toward self-sufficiency. The significant positive impacts on participation in education and job training activities continued through 26 months following enrollment, and some impacts on employment began emerging late in the study period in some subgroups. Of Early Head Start parents, 60.0 percent participated in education or job training (vs. 51.4 percent of control group parents); and 86.8 percent of program parents (compared with 83.4 percent of control parents) were employed at some time during the first 26 months after random assignment. These impacts did not result in significant improvements in income during this period, however.

- Early Head Start mothers were less likely to have subsequent births during the first two years after they enrolled: 22.9 percent of the program group vs. 27.1 percent of the control group mothers gave birth to another child within two years after beginning the study.

- Early Head Start had significant favorable impacts in several areas of fathering and father-child interactions, although the programs had less experience in providing services to fathers (compared with mothers). A subset of 12 of the 17 sites participated in father studies. Early Head Start fathers were significantly less likely to report spanking their children during the previous week (25.4 percent) than control group fathers (35.6 percent). In sites completing observations, Early Head Start fathers were also observed to be less intrusive; and program children were observed to be more able to engage their fathers and to be more attentive during play. Fathers and father figures from the program group families were significantly more likely to participate in program-related child development activities, such as home visits, parenting classes and meetings for fathers.

- The program impacts on children and parents in some subgroups of programs were larger than those in other subgroups. The subgroups in which the impacts were relatively large (with effect sizes in the 20 to 50 percent range across multiple outcomes) included mixed-approach programs, African American families, families who enrolled during pregnancy, and families with a moderately high (vs. a low or very high) number of demographic risk factors. In a few subgroups, the programs produced few significant favorable impacts (see below). Knowledge of these variations in impacts across subgroups can be used to guide program improvement efforts.

In sum, there is a consistent pattern of statistically significant, modest, favorable impacts across a range of outcomes when children were 2 and 3 years old, with larger impacts in several subgroups. Although little is known about how important this pattern of impacts sustained through toddlerhood will be in the long run, reductions in risk factors and improvements in protective factors may support improved later outcomes.

Consistent with programs' theories of change, we found evidence that the impacts on children when they were 3 years old were associated with impacts on parenting when children were 2. For example, higher scores on the cognitive development measure at age 3 were associated with higher levels of parent supportiveness in play and a more supportive cognitive and literacy environment when the children were 2; similarly, lower levels of child aggressive behavior at age 3 were related to greater warmth and lower levels of parents spanking and parenting stress when the children were 2 years old.

The programs' impacts on child and family outcomes were consistent with the substantial impacts the programs had on families' service receipt. Nearly all families received some services, but given the voluntary nature of the Early Head Start program, participation levels ranged from no participation to intensive participation throughout the evaluation period. On average, program families were enrolled in Early Head Start for 21 months, and half of the families remained in the program for at least two years. Many program families received intensive services. Although many families did not participate for the full period during which they were eligible or at the recommended levels throughout their enrollment, the program impacts on service receipt were substantial. Early Head Start families were, during the first 28 months after random assignment, significantly more likely than control families to receive a wide variety of services, much more likely to receive intensive services, and much more likely to receive intensive services that focused on child development and parenting.

FULL IMPLEMENTATION MATTERS

Implementing key services in accordance with the Head Start Program Performance Standards for quality and comprehensiveness is important to success.[6] When children were 2, programs that fully implemented key elements of the Head Start Program Performance Standards early had a stronger pattern of impacts than programs that reached full implementation of the standards later or not at all during the evaluation period. The differences in impacts on children and parenting among programs that fully implemented the standards early, later, or incompletely became less distinct by the 3-year assessment point, when all three groups of programs had some important impacts. Nevertheless, the findings show that:

- The early and later implementers produced a broader range of impacts at age 3 than the incomplete implementers.
- Although it is not possible to fully disentangle the effects of program approach and implementation pattern, there is evidence that reaching full implementation contributes to a stronger pattern of impacts. Mixed-approach programs that were fully implemented early demonstrated a stronger pattern of impacts at age 3 than those that were not, and some of these impacts were among the largest found in the study. Home-based programs that were fully implemented early or later demonstrated impacts on some important outcomes at age 3 that incompletely implemented home-based programs did not have. There were too few center-based programs to make this comparison across implementation patterns.

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[6] In-depth site visits provided information for rating levels of implementation along key program elements (24 elements in 1997 and 25 in 1999) contained in the Early Head Start program grant announcement and the Head Start Program Performance Standards. Although the implementation ratings designed for research purposes were not used to monitor compliance, they included criteria on most of the dimensions that the Head Start Bureau uses in program monitoring, including child development and health, family development, community building, staff development, and management systems. Details of the implementation study can be found in two reports, ***Leading the Way: Characteristics and Early Experiences of Selected Early Head Start Programs*** (Administration on Children, Youth and Families 1999) and ***Pathways to Quality and Full Implementation in Early Head Start Programs*** (Administration on Children, Youth and Families 2002).

Being fully implemented meant that programs achieved a rating of 4 or 5 on the 5-point scales used by the research team across most of the elements rated. Programs that were not fully implemented overall had implemented some aspects of the relevant program elements fully and had implemented other aspects, but not at a level required for a rating of 4 or 5. Some of the incompletely implemented programs showed strengths in family development, community building, or staff development.

ALL PROGRAM APPROACHES HAD IMPACTS

All program approaches for delivering services produced impacts on child and parent outcomes. Programs chose their service approaches based on local family needs, and programs selecting different approaches affected different outcomes:

- The center-based programs consistently enhanced cognitive development and, by age 3, reduced negative aspects of children's social-emotional development. The programs also demonstrated favorable impacts on several parenting outcomes, but had few impacts on participation in self-sufficiency-oriented activities.
- The home-based programs had favorable impacts on language development at age 2, but not at age 3. They had a favorable impact on children's engagement of their parents in semistructured play interactions at age 3. Only a few impacts on parents were significant, but parents in home-based programs reported less parenting stress than their control group. When the home-based programs reached full implementation, however, they had a stronger pattern of impacts. The programs that reached full implementation had significant favorable impacts on cognitive and language development at age 3 that have not generally been found in evaluations of home-visiting programs.
- The mixed-approach programs consistently enhanced children's language development and aspects of social-emotional development. These programs also had consistent significant favorable impacts on a wider range of parenting behavior and participation in self-sufficiency-oriented activities. The mixed-approach programs that became fully implemented early had a particularly strong pattern of impacts (with many significant impacts having effect sizes ranging from 20 to 50 percent). The stronger pattern of impacts among mixed-approach programs may reflect the benefits of families receiving both home-based and center-based services, the value of programs' flexibility to fit services to family needs, or the fact that these programs were able to keep families enrolled somewhat longer.

EARLY HEAD START HAD IMPACTS ACROSS DEMOGRAPHIC GROUPS

The programs reached all types of families with child development services and provided them with a significantly greater number of services and more-intensive services than they would have received in their communities without the benefit of Early Head Start. By age 3, Early Head Start had some favorable impacts on most subgroups of children. Similarly, most subgroups of parents benefited in some way related to their parenting. The programs also helped parents in most subgroups work toward self-sufficiency. Of the

27 subgroups of families studied, 23 experienced significant favorable impacts on child development, and 24 experienced significant favorable impacts on parenting outcomes.[7]

Among the many subgroups of families studied, some groups benefited more than others.

- Pregnant or parenting when enrolled: Earlier intervention is better. The impacts on child outcomes were greater for children whose mothers enrolled during pregnancy, as were a number of impacts on parenting (such as supportiveness during play). The impacts on other aspects of parenting, including daily reading, were somewhat larger among families who enrolled after their children were born.
- Whether parent enrolled with first- or later-born child: The programs had significant favorable impacts on child development and parenting in families who enrolled with firstborn children as well as those who enrolled with later-born children. Early Head Start consistently increased the participation in education of parents of firstborn children, however, and reduced the proportion who had another baby during the first two years after enrollment.
- Race/Ethnicity: The Early Head Start programs were especially effective in improving child development and parenting outcomes of the African American children and parents who participated, and they also had a favorable pattern of impacts on the Hispanic children and parents who participated. Although many impacts on child development and parenting were in a positive direction among white families, virtually none was statistically significant. The more-disadvantaged status of African American control group children and families relative to the control families in other racial/ethnic groups may have set the stage for the Early Head Start programs to make a larger difference in the lives of the African American children and parents they served. Early Head Start brought many of the outcomes of African American children and parents in the program group closer to the levels experienced by the other racial/ethnic groups.

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[7] We examined the programs' impacts on 27 subgroups, which were defined based on 11 family characteristics at the time of random assignment. The subgroups were defined based on one characteristic at a time, and the subgroups naturally overlap. In sensitivity analyses we found that the patterns of differential impacts largely remained after potential confounding characteristics were controlled.

- Number of demographic risks: Families facing many risks usually pose difficult challenges for early intervention and family support programs, and this was true for the Early Head Start research programs as well.[8] Early Head Start had strong impacts on families who had 3 of the 5 demographic risks we counted. The programs had only a few significant impacts on families with fewer than 3 demographic risks, and the impacts on the families with more than 3 risks were unfavorable. (Interestingly, programs did significantly delay subsequent births in the group with more than 3 risks). Previous research suggests that low-income families who have experienced high levels of instability, change, and risk may be overwhelmed by changes that a new program introduces into their lives, even though the program is designed to help. As a result, the program requirements may create unintended negative consequences for these families. Because families with the most risks were more likely to be in home-based or mixed-approach programs that were not fully implemented early, it is possible that the staff turnover and disruptions in staff-family relationships experienced in some of these programs had an adverse effect on the most vulnerable families.

The Early Head Start programs also benefited two difficult-to-serve subgroups:

- Parents at risk for depression: Among parents at risk of depression in the eight research sites that measured depression at baseline, Early Head Start parents reported significantly less depression than control-group parents when children were 3, and Early Head Start demonstrated a favorable pattern of impacts on children's social-emotional development and parenting outcomes among these families. Although Early Head Start was also effective with children whose parents did not report symptoms of depression, the impacts on families of parents with depressive symptoms are notable, as that is a group that other programs have found difficult to serve.

- Teenage parents: The impacts on teenage mothers and their children are also particularly notable. Like other programs designed to increase self-sufficiency among disadvantaged teenage parents, the

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[8] The families whom Early Head Start serves are all at risk to some degree because of their low incomes. For our analyses, we considered five demographic risk factors in addition to income (and whatever other family circumstances may not have been measured). These were (1) being a single parent, (2) receiving public assistance, (3) being neither employed nor in school or job training, (4) being a teenage parent, and (5) lacking a high school diploma or GED.

Early Head Start research programs succeeded in increasing school attendance among teenage parents. Unlike other large-scale programs, however, the programs also enhanced their children's development. Early Head Start also provided support for children's development if they had older parents.

LESSONS FOR PROGRAMS

The impact findings, taken together with findings from the study of program implementation (see *Pathways to Quality*), suggest several lessons for programs. A number of the lessons pertain to program implementation:

- Implementing key elements of the Head Start Program Performance Standards fully is important for maximizing impacts on children and parents. The research programs that reached full implementation by fall 1999 had a stronger pattern of impacts on child and family outcomes than the programs that did not.
- Programs offering center-based services should seek ways to place greater emphasis on parenting, parent-child relationships, and family support, areas in which the center-based research programs did not have a strong pattern of impacts. They should also increase efforts to support language development.
- Programs offering home-based services should strive to deliver a greater intensity of services, including meeting the required frequency of home visits and group socializations, while also attending to children's cognitive development and encouraging and supporting center-based activities for children as they become older toddlers. As documented in the implementation study, delivering home visits at the required intensity was extremely challenging, and the pattern of impacts produced by the home-based research programs suggests that doing so is important.
- Programs may need to investigate new or alternative strategies for serving families who have many demographic risk factors.

Two lessons for programs emerge from the evaluation findings related to specific outcomes:

- To ensure the safety of infants and toddlers, programs (especially center-based ones) should be more vigilant about parental safety practices. When children were 3, programs did not increase consistent, correct use of car seats among families, a finding that parallels the difficulties programs had in supporting a range of safety practices at age 2.

- Greater access to services to address the mental health needs of parents, many of whom reported symptoms of depression and parenting stress, is needed. Although several subgroups demonstrated that favorable impacts on parent mental health outcomes are possible, we found no significant impacts on receipt of mental health services or on parent mental health outcomes overall.

Finally, several recommendations for programs pertain to which families they should seek to enroll and the timing of enrollment:

- Programs should enroll parents and children as early as possible, preferably before children are born. Although the programs improved outcomes among children whose families enrolled after the children were born, the strongest pattern of impacts was achieved with children whose families enrolled earlier.
- Programs should enroll parents at all stages of childbearing. The research programs had favorable impacts on both firstborn and later-born children and their parents.

LESSONS FOR POLICYMAKERS

The evaluation findings also have implications for policymakers, including Head Start Bureau staff and policymakers concerned with programs and policies serving low-income families with very young children:

- Early Head Start programs may provide a foundation of support for children's development among families who are struggling with their own economic and developmental needs. At the same time they were increasing participation in education and employment-oriented activities, the Early Head Start research programs had significant favorable impacts on children's development. These improvements occurred despite the fact that average family income did not increase significantly.
- Early Head Start programs provide effective ways of serving some difficult-to-serve families. The research programs achieved favorable significant impacts among teenage parents and parents who reported depressive symptoms when they enrolled, including significant positive impacts on children as well as parents.
- Like other early childhood programs, Early Head Start programs may have the greatest opportunity to improve outcomes among

families with a moderate number of demographic risks, but are challenged to significantly improve outcomes among the highest-risk families with young children.

- This study validated the importance of meeting the Head Start Program Performance Standards for achieving impacts on children and parents, and it underscores the value of monitoring programs regularly. The performance standards may be useful as a guide to providing effective services in other early childhood and early intervention programs as well.
- The strong pattern of impacts among mixed-approach programs suggests that flexibility in service options for families would be valuable when community needs assessments show that both home- and center-based services are needed.

LESSONS FOR RESEARCHERS

Finally, the national Early Head Start Research and Evaluation project incorporated some innovative features into a large, multisite evaluation, and the evaluation findings have implications for researchers:

- Devoting significant resources to conceptualizing, documenting, and analyzing the implementation process and understanding as fully as possible the approaches (strategies and activities) that programs take in delivering services is critical for understanding program impacts and deriving lessons from them.
- Using multiple methods for measuring outcomes, so that findings are not dependent only on parent reports, child assessments, or any single methodology, increases the confidence that can be placed in the impact findings. The Early Head Start findings are based on a mixture of direct child assessments, observations of children's behavior by in-person interviewers, ratings of videotaped parent-child interactions in standardized ways, ratings of children's behaviors by their parents, and parents' self-reports of their own behaviors, attitudes, and circumstances.
- Identifying subgroups of programs and policy-relevant populations is valuable so that analyses can begin to address questions about what works for whom. Having adequate numbers of programs and adequate sample sizes within sites to make program-control comparisons of outcomes for particular subgroups of sites or subgroups of families can provide important insights into program impacts under particular conditions and for particular groups of families.

- Incorporating local perspectives in national evaluation studies enables the voices of programs and local researchers to supplement the cross-site analyses and enhance the interpretation of the national findings. This report demonstrates the diversity of research at the local program level that can be brought to bear on a large number of developmental, programmatic, and policy questions.

- Partnerships with local programs were important to the success of the evaluation, and participating in the research enhanced local programs' continuous program improvement processes.

NEXT STEPS

More analyses are available in two special policy reports that provide additional findings related to children's health and child care. In addition, members of the Early Head Start Research Consortium are continuing to analyze national data, and local research partners are analyzing local data. Reports similar to those presented in Volume III will continue to appear in the future. Finally, ACF/ACYF are sponsoring a longitudinal follow-up study in which the children in the national sample at the 17 sites are being assessed, and their mothers and fathers interviewed, as they enter kindergarten. The follow-up study, which will be completed by 2004, will provide an opportunity to learn about the experiences of Early Head Start children and families after they leave the program.

TABLE 1

SELECTED KEY GLOBAL IMPACTS ON CHILDREN AND PARENTS WHEN CHILDREN WERE 2 AND 3 YEARS OLD

	Impacts at Age 2				Impacts at Age 3			
Outcome	Program Group Mean	Control Group Mean	Estimated Impact per Participant	Effect Size (Percent)[a]	Program Group Mean	Control Group Mean	Estimated Impact per Participant	Effect Size (Percent)[a]
Child Cognitive and Language Development								
Average Bayley Mental Development Index (MDI)	90.1	88.1	2.0***	14.9	91.4	89.9	1.6**	12.0
Percentage with MDI Below 85	33.6	40.2	-6.6**	-13.5	27.3	32.0	-4.7*	-10.1
CDI Vocabulary Production Score	56.3	53.9	2.4**	10.8	NA	NA	NA	NA
CDI Sentence Complexity Score	8.6	7.7	0.9**	11.4	NA	NA	NA	NA
CDI Percentage Combining Words	81.0	77.9	3.1	7.4	NA	NA	NA	NA
Peabody Picture Vocabulary Test (PPVT-III) Standard Score	NA	NA	NA	NA	83.3	81.1	2.1**	13.1
Percent with PPVT-III Below 85	NA	NA	NA	NA	51.1	57.1	-6.0**	-12.1
Child Social-Emotional Development								
Child Behavior Checklist: Aggressive Behavior	9.9	10.5	-0.6**	-10.2	10.6	11.3	-0.7**	-10.8
Bayley Behavior Rating Scale (BRS): Emotional Regulation	3.6	3.6	-0.0	1.4	4.0	4.0	0.0	0.6
Bayley BRS: Orientation/Engagement	3.7	3.6	0.0	0.5	3.9	3.8	0.0	4.0
Child Frustration During Parent-Child Puzzle Challenge Task	NA	NA	NA	NA	2.7	2.7	0.0	2.2
Engagement of Parent During Parent-Child Semistructured Play	4.3	4.2	0.1	7.6	4.8	4.6	0.2***	20.3
Engagement of Parent During Parent-Child Puzzle Challenge Task	NA	NA	NA	NA	5.0	4.9	0.1	8.8
Negativity Toward Parent During Parent-Child Semistructured Play	1.7	1.8	-0.1	-8.0	1.2	1.3	-0.1**	-13.8
Sustained Attention to Objects During Parent-Child Semistructured Play	5.0	5.0	0.1	6.8	5.0	4.8	0.2***	15.9
Persistence During Parent-Child Puzzle Challenge Task	NA	NA	NA	NA	4.6	4.5	0.1	6.3

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TABLE 1 *(continued)*

Outcome	Impacts at Age 2				Impacts at Age 3			
	Program Group Mean	Control Group Mean	Estimated Impact per Participant	Effect Size (Percent)[a]	Program Group Mean	Control Group Mean	Estimated Impact per Participant	Effect Size (Percent)[a]
Parenting Behavior								
Supportiveness During Parent-Child Semistructured Play	4.1	3.9	0.1**	13.5	4.0	3.9	0.1***	14.6
Supportive Presence During Parent-Child Puzzle Challenge Task	NA	NA	NA	NA	4.5	4.4	0.1	4.2
Quality of Assistance During Parent-Child Puzzle Challenge Task	NA	NA	NA	NA	3.6	3.5	0.1*	9.0
Detachment During Parent-Child Semis-Structured Play	1.4	1.5	-0.1*	-10.4	1.2	1.3	-0.1*	-9.0
Detachment During Parent-Child Puzzle Challenge Task	NA	NA	NA	NA	1.6	1.6	-0.0	-0.2
Intrusiveness During Parent-Child Semis-Structured Play	1.9	1.9	0.0	3.0	1.6	1.6	-0.0	-5.5
Intrusiveness During Parent-Child Puzzle Challenge Task	NA	NA	NA	NA	2.7	2.7	-0.1	-5.8
Negative Regard During Parent-Child Semis-Structured Play	1.5	1.5	0.0	3.9	1.3	1.3	-0.0	-1.6
Home Observation for Measurement of the Environment (HOME): Emotional Responsivity	6.2	6.1	0.1*	8.1	NA	NA	NA	NA
HOME: Harshness	NA	NA	NA	NA	0.3	0.3	0.0	2.1
HOME: Warmth	NA	NA	NA	NA	2.6	2.5	0.1*	9.0
HOME: Total Score	26.5	26.1	0.4**	9.8	27.6	27.0	0.5**	10.9
HOME: Support of Language and Learning	10.3	10.1	0.2***	11.5	10.6	10.4	0.2**	9.9
Parent-Child Play	4.6	4.5	0.1**	11.7	4.4	4.3	0.1*	9.1
Percentage of Parents Who Read to Child Every Day	57.9	52.3	5.6**	11.3	56.8	52.0	4.9**	9.7
Percentage of Parents Who Read to Child at Bedtime	29.4	22.6	6.8***	16.0	32.3	29.2	3.1	6.8
Percentage of Parents Who Set a Regular Bedtime for Child	61.6	55.8	5.9**	11.8	59.4	58.2	1.3	2.5
HOME: Internal Physical Environment	NA	NA	NA	NA	7.8	7.8	0.0	-0.3

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TABLE 1 *(continued)*

Outcome	Impacts at Age 2				Impacts at Age 3			
	Program Group Mean	Control Group Mean	Estimated Impact per Participant	Effect Size (Percent)[a]	Program Group Mean	Control Group Mean	Estimated Impact per Participant	Effect Size (Percent)[a]
Parenting Knowledge and Discipline Strategies								
Knowledge of Infant Development Inventory	3.4	3.3	0.1***	12.3	NA	NA	NA	NA
Percentage of Parents Who Use Guards or Gates for Windows	62.7	65.0	-2.3	4.7	NA	NA	NA	NA
Percentage of Parents Who Always Use a Car Seat for Child	NA	NA	NA	NA	69.8	70.8	-0.9	-2.0
Percentage of Parents Who Spanked Child in Previous Week	47.4	52.1	-4.7*	-9.4	46.7	53.8	-7.1***	-14.2
Percentage of Parents Who Suggested Responses to Hypothetical Situations with Child: Prevent or Distract	72.9	66.8	6.1***	12.9	70.6	69.3	1.3	2.8
Percentage of Parents Who Suggested Responses to Hypothetical Situations with Child: Talk and Explain	37.2	31.1	6.1**	12.9	70.7	69.1	1.7	3.6
Percentage of Parents Who Suggested Responses to Hypothetical Situations with Child: Physical Punishment	27.7	29.7	-2.0	-4.3	46.3	51.1	-4.8**	-9.6
Percentage of Parents Who Suggested Only Mild Responses to Hypothetical Situations with Child	43.1	39.1	4.0*	8.2	44.7	40.5	4.2*	8.5
Parent's Physical and Mental Health and Family Functioning								
Family Environment Scale – Family Conflict	1.7	1.7	-0.1**	-11.0	1.7	1.7	0.0	-4.3
Parenting Stress Index : Parental Distress	25.0	25.9	-1.0**	-10.2	24.7	25.5	-0.7	-7.7
PSI : Parent-Child Dysfunctional Interaction	16.9	17.4	-0.6*	-9.4	17.8	17.8	-0.0	-0.2
CIDI-Depression – Average Probability	15.3	15.6	-0.3	-0.8	NA	NA	NA	NA
Center for Epidemiological Studies Depression (CES-D: Short Form)	NA	NA	NA	NA	7.4	7.7	-0.3	-3.7
Parent's Health Status – Average Score	3.5	3.5	0.0	2.3	3.4	3.5	-0.1	-4.9
Child's Health Status – Average Score	3.8	3.9	-0.1	-5.5	4.0	4.0	-0.0	1.5

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TABLE 1 *(continued)*

Outcome	Impacts at Age 2 Program Group Mean	Impacts at Age 2 Control Group Mean	Impacts at Age 2 Estimated Impact per Participant	Impacts at Age 2 Effect Size (Percent)[a]	Impacts at Age 3 Program Group Mean	Impacts at Age 3 Control Group Mean	Impacts at Age 3 Estimated Impact per Participant	Impacts at Age 3 Effect Size (Percent)[a]
Parent Self-Sufficiency								
Percentage of Parents Who Ever Participated in an Education or Job Training Program in First 15 Months After Random Assignment	48.4	43.7	4.7**	10.7	NA	NA	NA	NA
Percentage of Parents Who Ever Participated in an Education or Job Training Program in First 26 Months After Random Assignment	NA	NA	NA	NA	60.0	51.4	8.6***	17.2
Total Hours/Week in Education/Training in First 15 Months After Random Assignment	5.3	4.1	1.1***	14.6	NA	NA	NA	NA
Total Hours/Week in Education/Training in First 26 Months After Random Assignment	NA	NA	NA	NA	4.6	3.4	1.2***	18.4
Percentage of Parents Ever Employed in First 15 Months After Random Assignment	72.2	71.9	0.2	0.5	NA	NA	NA	NA
Percentage of Parents Ever Employed in First 26 Months After Random Assignment	NA	NA	NA	NA	86.8	83.4	3.4*	9.0
Average Hours per Week Employed at All Jobs in First 15 Months After Random Assignment	14.6	15.4	-0.8	-5.5	NA	NA	NA	NA
Average Hours per Week Employed at All Jobs in First 26 Months After Random Assignment	NA	NA	NA	NA	17.1	17.1	0.1	0.5
Percentage of Parents Who Received Any Welfare Benefits During First 15 Months After Random Assignment	65.3	64.6	0.7	1.5	NA	NA	NA	NA
Percentage of Parents Who Received Any Welfare Benefits During First 26 Months After Random Assignment	NA	NA	NA	NA	68.1	66.5	1.6	3.5
Percentage of Families with Income Above the Poverty Line at Second Followup	33.8	36.4	-2.5	-7.0	NA	NA	NA	NA
Percentage of Families with Income Above the Poverty Line at Third Followup	NA	NA	NA	NA	42.9	43.3	-0.4	-0.8
Dunst Family Resource Scale at Second Followup	153.1	152.2	0.8	0.6	NA	NA	NA	NA
Dunst Family Resource Scale at Third Followup	NA	NA	NA	NA	154.8	153.8	1.0	5.2
Percentage With Any Births (Not Including Focus Child) Within 24 Months After Random Assignment	NA	NA	NA	NA	22.9	27.1	-4.2*	-9.2

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TABLE 1 *(continued)*

SOURCE: Birthday-related child assessments and parent interviews conducted when children were 24 and 36 months old and parent services follow-up interviews conducted 15 and 26 months after random assignment.

NOTE: The impact estimates do not always exactly equal the program group minus the control group means due to rounding. All impact estimates were calculated using regression models, where each site was weighted equally. A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had been assigned to the program group instead. This unobserved mean was estimated as the difference between the program group mean for participants and the impact per participant. The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for all program and control group members.

[a] The effect size is calculated by dividing the estimated impact per participant on the outcome measure by the standard deviation of the outcome measure among the control group. Thus, it provides a way of comparing impacts across measures in terms of the size of the program-control difference relative to the standard deviation, expressed as a percentage.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

I. INTRODUCTION: BACKGROUND AND CONTEXT FOR THE EVALUATION

Early Head Start has become a major national initiative in the six years since its beginning. Following the Administration on Children, Youth and Families' (ACYF) funding of 68 grantees in fall 1995, the program has grown to 664 programs that in 2002 serve more than 55,000 low-income families with infants and toddlers throughout the country. With an increasing share of the Head Start budget, up to 10% in 2002, Early Head Start is an ambitious effort in which ACYF is responding to the "quiet crisis" facing American infants and toddlers, as identified by the Carnegie Corporation of New York in its 1994 *Starting Points* report.[1] The final report of the Early Head Start Research and Evaluation project traces the services that Early Head Start families in 17 programs received over approximately 26 months in the program, describes the differences that the programs made in the services families received, and examines their impacts on the children and families through the children's third birthdays. This report builds on the Early Head Start implementation study, which is fully described in two reports: *Leading the Way* (Administration on Children, Youth and Families 1999a, 1999b, 2000a, and 2000b) and *Pathways to Quality* (Administration on Children, Youth and Families 2002).

This chapter begins with a synopsis of the findings and then reviews the history of the program and the policy, programmatic, and research context for both the program and its evaluation. We summarize the questions the evaluation addresses, the conceptual framework guiding this research, and the general hypotheses that underlie the analyses. We then describe the 17 research programs, their families, and their communities, and follow with a description of the design, sample, and analytic approaches taken in the study.

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[1] The 1994 and 1998 Head Start reauthorizations directed that the percentage of the annual Head Start budget allocated to the new Early Head Start program was to begin at 3 percent in 1995 and increase to 9 percent for 2001 and 10 percent for 2002 and 2003.

Subsequent chapters describe:

- The evaluation methodology and analytic approaches (Chapter II)
- The services received by Early Head Start mothers, fathers, and children, and the difference the programs have made in the rates, duration, and intensity of their participation in a wide range of services during the initial period following program enrollment (Chapters III and IV)
- The programs' influence on children's development, parenting, and family development when the children were 3 years of age (Chapter V)
- The differential impacts of programs offering different service approaches and achieving different levels of implementation result in (Chapter VI)
- Variations in impacts among key subgroups of children and families (Chapter VII)
- Implications of these findings for policy, practice, and research (Chapter VIII)

In text "boxes," this report also incorporates findings related to the fathers of Early Head Start children and presents what we have learned about their involvement with the programs and with their children. Appendixes in Volume II describe aspects of the methodology in greater detail and provide supplementary tables of findings. In addition, findings and perspectives from local program and research partners are integrated throughout and highlighted in text "boxes." Reports of the local research are presented in Volume III in greater depth.

A. OVERVIEW OF THE FINDINGS

Early Head Start programs had numerous consistent overall impacts on children, parents, and families when children were 3 years old. These findings in many ways continue the trends observed when children were 2 years old, as reported in the interim report, *Building Their Futures* (ACYF 2001). As we present the findings in subsequent chapters, we describe how they do—or do not, in some cases—replicate or continue the impacts at age 2. Highlights of these findings include the following:

- The Early Head Start research programs substantially increased the services families received.
- When children were 3 years old, the Early Head Start programs largely sustained the positive impacts on cognitive, language, and social-emotional development found at age 2. The program continued to have favorable impacts on a wide range of parenting outcomes as well. These include positive impacts on parental emotional support and support for language and learning and discipline practices. The programs also had important impacts on parents' progress towards self-sufficiency.
- Full implementation matters: programs that fully implemented key program performance standards had a stronger pattern of favorable impacts on child and parenting outcomes than those that did not reach full implementation.
- All program approaches had positive impacts on child and parent outcomes, although mixed-approach programs had the strongest pattern of impacts.
- Mixed-approach programs that were fully implemented early had a stronger pattern of impacts than those that became fully implemented later or did not reach full implementation, and home-based programs that were fully implemented had a stronger pattern of impacts than those that never became fully implemented during the evaluation period. There were too few center-based programs to conduct this analysis by implementation pattern.
- Programs served families with diverse characteristics, and the programs were differentially effective for different demographic subgroups. Although patterns of impacts varied, Early Head Start programs improved some outcomes for nearly every subgroup in the study.
- Patterns of program impacts varied by race/ethnicity. There was a strong pattern of impacts for African American families, a number of notable positive impacts among Hispanic families, but virtually no impacts on child and parent outcomes for white families.
- Early Head Start programs improved child and parenting outcomes among some subgroups of difficult-to-serve families that have special policy relevance, including teenage mothers and parents who were at risk of depression at the time they enrolled.
- Programs had positive impacts on several areas of fathering and on father-child interactions. Fathers and father figures from program families were more likely than those from control families to participate in program-related child development activities, such as home visits, parenting classes, and meetings for fathers.

The numerous Early Head Start impacts that span most important outcome areas at age 3, even though modest in size, represent a significant policy achievement, given the history of program evaluations demonstrating few positive impacts. Early Head Start programs have not produced impacts in every dimension of child development, parenting, and family functioning that they hoped to influence, however, and this report also describes areas in which programs could work to enhance their services. The differential impacts across subgroups of programs and families also have important implications for program improvement. Programs were particularly effective for some subgroups, while they are challenged to better serve families in other subgroups. We return to the details of these findings after reviewing the national program's history, describing the research questions that the study addressed, summarizing the programs and their families and communities, and describing the evaluation's design and methodology.

B. EARLY HEAD START, ITS HISTORY, AND ITS DEVELOPMENT AS A NATIONAL PROGRAM

Early Head Start programs are comprehensive, two-generation programs that focus on enhancing children's development while strengthening families. Designed for low-income pregnant women and families with infants and toddlers up to age 3, the programs provide a wide range of services through multiple strategies. Services include child development services delivered in home visits, child care, case management, parenting education, health care and referrals, and family support. Early Head Start programs try to meet families' and communities' needs through one or more official program options: (1) home-based, (2) center-based, (3) combination (in which families receive both home visits and center experiences), and (4) locally designed. Because a *program* may offer multiple options, we characterized programs for research purposes according to the options they offer *families*. For the purposes of the research, programs were grouped according to three program approaches (home-based, center-based, and mixed-approach), which are described in Section D.

A number of key events and changes, both external to and within the Head Start/Early Head Start infrastructure, shaped the development of the programs during their first six years. Figure I.1 depicts the timing of these key events. We describe these and other events in the following sections.

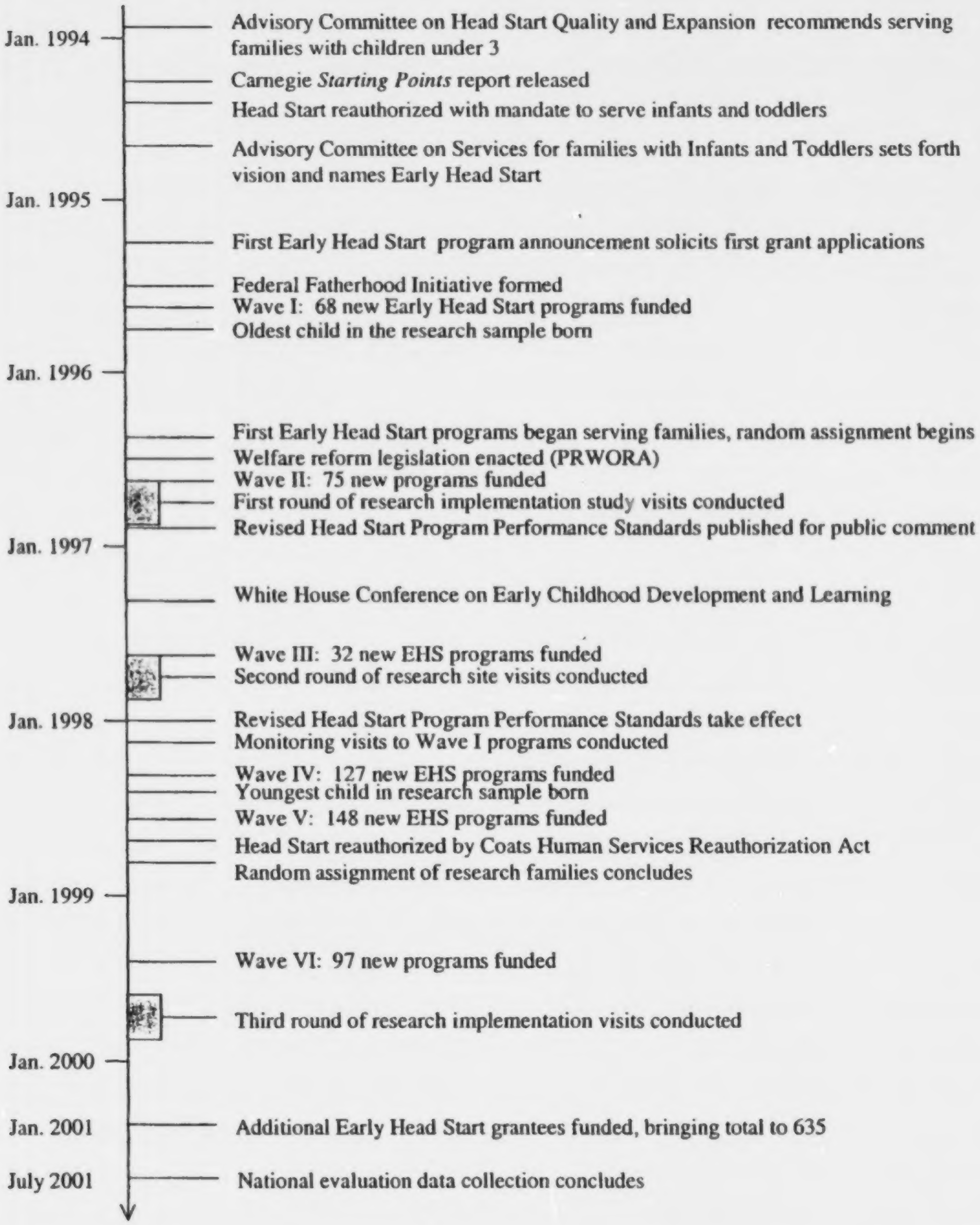
1. The Role of Legislation and Advisory Committees

The federal Early Head Start program began with bipartisan support provided by the 1994 Head Start reauthorization. This legislation established the mandate for infant-toddler services within Head Start. The 1998 Head Start reauthorization propelled the program toward rapid expansion, which saw an increase from 68 programs in 1995, when the evaluation was getting underway, to 664 programs in spring 2002, serving some 55,000 children.

Leading up to these mandates, a comprehensive study of Head Start services by the Advisory Committee on Head Start Quality and Expansion called for developing a "new initiative for expanded Head Start supports to families with children under age three." At the same time, the committee recommended actions to ensure that such services be of the highest quality and that new partnerships be forged to reduce fragmentation of services (U.S. Department of Health and Human Services [DHHS] 1993). In response to the 1994 reauthorizing legislation, the Secretary of DHHS appointed the Advisory Committee on Services for Families with Infants and Toddlers. It envisioned a two-generation program with intensive services beginning before birth and concentrating on enhancing development and supporting the family during the critical first three years of the child's life (U.S. Department of Health and Human Services 1995). The Advisory Committee recommended that programs be designed to produce outcomes in four domains:

FIGURE I.1

KEY EVENTS IN THE HISTORY OF EARLY HEAD START



Advisory Committee on Head Start Quality and Expansion recommends serving families with children under 3

Jan. 1994

Carnegie *Starting Points* report released

Head Start reauthorized with mandate to serve infants and toddlers

Advisory Committee on Services for families with Infants and Toddlers sets forth vision and names Early Head Start

Jan. 1995

First Early Head Start program announcement solicits first grant applications

Federal Fatherhood Initiative formed

Wave I: 68 new Early Head Start programs funded

Oldest child in the research sample born

Jan. 1996

First Early Head Start programs began serving families, random assignment begins

Welfare reform legislation enacted (PRWORA)

Wave II: 75 new programs funded

First round of research implementation study visits conducted

Revised Head Start Program Performance Standards published for public comment

Jan. 1997

White House Conference on Early Childhood Development and Learning

Wave III: 32 new EHS programs funded

Second round of research site visits conducted

Jan. 1998

Revised Head Start Program Performance Standards take effect

Monitoring visits to Wave I programs conducted

Wave IV: 127 new EHS programs funded

Youngest child in research sample born

Wave V: 148 new EHS programs funded

Head Start reauthorized by Coats Human Services Reauthorization Act

Random assignment of research families concludes

Jan. 1999

Wave VI: 97 new programs funded

Third round of research implementation visits conducted

Jan. 2000

Jan. 2001

Additional Early Head Start grantees funded, bringing total to 635

July 2001

National evaluation data collection concludes

1. ***Child development*** (including health and social, cognitive, and language development)
2. ***Family development*** (including parenting and relationships with children, the home environment and family functioning, family health, parent involvement, and economic self-sufficiency)
3. ***Staff development*** (including professional development and relationships with parents)
4. ***Community development*** (including enhanced child care quality, community collaboration, and integration of services to support families with young children)

The Advisory Committee also stressed continuous program improvement and recommended that both national and local research be conducted to inform the development of the new Early Head Start program. The committee specified that local programs conduct annual self-assessments and improve their services based on analysis of local data. Both the 1994 and 1998 Head Start reauthorizing legislation specified that an evaluation begin early to focus on learning about all the services being delivered to families with infants and toddlers and the impacts of services on children and families.

The evaluation reported here is the result of this early planning, as well as DHHS research and evaluation planning. In 1990, the Secretary's Advisory Panel for the Head Start Evaluation Design Project (commonly known as the "blueprint" committee) concluded that it was important for evaluations to reject the generic question of "what works?" and move toward designs that would address questions on the theme of "what works for whom, and under what conditions?" In addition, the blueprint committee explicitly recommended that Head Start research be conducted through collaborative enterprises and have as one of its emphases providing findings that could be used by programs for their continuous improvement (U.S. Department of Health and Human Services 1990). All of these elements have been incorporated into the Early Head Start Research and Evaluation project from its very beginning.

2. The National Early Head Start Program

At the very outset of Early Head Start, ACYF created an infrastructure for supporting programs. This included the revised Head Start Program Performance Standards, an ongoing training and technical assistance (T&TA) system, and program monitoring. Early Head Start program guidelines also emphasized the importance of continuous program improvement, and built in research from the very beginning.

The Head Start Program Performance Standards, which have guided Head Start practice since the 1970s, were revised and published for comment in November 1996. The revised standards went into effect in January 1998, bringing Early Head Start programs under the Head Start standards umbrella. Between fall 1996 and January 1998, the Head Start Bureau worked with Early Head Start programs to clarify a number of the new elements in the standards. Within ACYF, the Head Start Bureau, under the leadership of the late Helen Taylor, emphasized the centrality of children's development and stressed program quality through adherence to the standards. The bureau worked with both Head Start and Early Head Start programs to meet the standards, and some programs that were not able to improve have closed.

In 1995, ACYF created the Early Head Start National Resource Center (NRC) to provide ongoing support, training, and technical assistance to all waves of Early Head Start programs. Operated under contract by the ZERO TO THREE national organization, the NRC provided a range of services:

- Week-long training in infant care ("intensives") and annual institutes for all Head Start programs serving families with infants and toddlers
- Provision of a cadre of infant-toddler experts for (1) working with ACYF regional offices and Indian and Migrant program branches, and (2) conducting one-on-one consultations

- Coordination with ACYF's regional training centers, the Head Start Quality Improvement Centers (HSQICs) and Disabilities Services Quality Improvement Centers (DSQICs)

The 1998 Head Start reauthorization included funding for a leadership position for Early Head Start programs within the Head Start Bureau, supporting the mandated expansion of Early Head Start and monitoring to ensure program quality. Through comprehensive on-site visits, monitoring teams review programs for standards compliance every three years.

3. The Program's Policy Context

During the initial period of Early Head Start's implementation, significant national, state, and local changes were occurring, potentially affecting the approaches taken by Early Head Start programs, the way families responded, and how programs and communities interacted. The increasing focus on the importance of early development (including brain development) attracted the attention and support of policymakers, program sponsors, and community members for Early Head Start services. Just at the time that Early Head Start began serving families, the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) enacted major reforms to the nation's system for providing income support to low-income families. This caused some programs to adjust their service delivery plans to meet changing family needs. Because some states no longer exempted mothers of infants from work requirements, some parents became more receptive to employment-related services (including child care) and may have been less available to participate in some program activities. It became more challenging for programs to provide services through home visits.

In some states, changes associated with PRWORA have made it easier for families to obtain child care subsidies and have spurred states to improve and expand child care. Several states where Early Head Start research programs are located have increased funding for child care, aided centers seeking accreditation, or facilitated quality improvements for infant-toddler care. The expansion of prekindergarten programs in some states may have created opportunities for children's transition to other programs when they leave Early Head Start, while new prekindergarten programs often compete for the same well-trained staff that Early Head Start programs need.

The federal Fatherhood Initiative has heightened attention to the role of fathers in a wide range of federal programs and has increased Early Head Start programs' efforts to draw men into their program activities and into the lives of Early Head Start children. In addition, programs may have responded to PRWORA's increased emphasis on establishing paternity and enforcing child support.

A strong economy with low unemployment rates throughout the period of the early development of Early Head Start programs probably helped them meet the many needs of their low-income families. While some of the families were eligible for health care assistance through the Children's Health Insurance Program (CHIP), most were served by Medicaid. With CHIP, some states with Early Head Start programs have moved far in providing health services for all children.

4. The Research Context for the Early Head Start Program and Its Evaluation

Over the past decade, findings from a number of program evaluations have emerged that have a direct bearing on the Early Head Start evaluation. Some findings—particularly those from the Comprehensive Child Development Program (CCDP) and the Packard Foundation's review of home-visiting programs—identified many of the challenges inherent in trying to make a difference for infants and toddlers in low-income families. The CCDP experience highlighted the importance of focusing program services on child development, while the home-visiting literature revealed the importance of understanding—and measuring—the implementation and intensity of services. These lessons influenced both the guidance that ACYF has provided to Early Head Start programs over the past six years and the design of this evaluation.

a. Brief Review of Evaluations of Other Infant-Toddler Programs

A number of evaluations of two-generation programs serving low-income families with infants and toddlers have been conducted over the last quarter century. Program effects have often appeared weak, but the findings are difficult to interpret because of the great diversity in program approaches, research methodologies and populations served across studies. Programs have varied in (1) the duration and intensity of services, (2) the timing of services, (3) their status as home- or center-based (or both), (4) the duration and intensity of the parenting component, (5) the extent of reliance on case management, (6) the nature of self-sufficiency (adult education and job training) components and (7) populations served. Many intervention programs have begun by focusing on a single population group or within a single community context. The research has also been variable, with differences in designs, domains assessed, timing of assessments, degree of information on program implementation, and extent of information on services received by control group families. Findings from seven major studies, or series of studies, are summarized here.

The Child and Family Resource Program was a comprehensive, two-generation demonstration program for families with infants and toddlers. The program produced significant effects on a number of parent outcomes after three years (employment or job training, coping skills, sense of control) and on parent-child teaching skills, but did not significantly affect children's cognitive or social development (Nauta and Travers 1982).

Randomized studies of three Parent Child Development Centers (PCDCs) focused on mother-child interactions and infant/toddler cognitive development. Dokecki, Hargrave, and

Sandler (1983) found impacts on positive maternal behaviors at two sites and significantly higher Stanford Binet scores for PCDC children at two sites.

Between 1972 and 1977, the Carolina Abecedarian Project enrolled 120 "high-risk" African American families in four cohorts. From these, 111 children were randomly assigned to the program, which included full-time child care beginning in the first three months of life, or to a control group. Families and children continued receiving services until age 5. The program, which also provided social supports for families, was highly successful in improving children's cognitive development relative to the control group, with significant differences at 18, 24, and 36 months of age, and with an effect size of more than 1 standard deviation at 36 months (Campbell and Ramey 1994; and Ramey and Campbell 1991). The largest effects were found for children with the most extreme environmental risks. No effects were found on the families' home environments. The intervention impacts appeared to be smaller when control group children enrolled in community child care (Guralnick 2000). Follow-up studies showed that program effects persisted at every assessment point through 16 to 20 years of age.

Olds' Nurse Home Visitation Program is a model, designed some 20 years ago, in which nurses visit first-time mothers, beginning during pregnancy and continuing until the children are 2 years old, "to improve pregnancy outcomes, promote children's health and development, and strengthen families' economic self-sufficiency" (Olds et al. 1999). Results of two randomized trials show reduced rates of childhood injuries and ingestions (events perhaps associated with child abuse and neglect). For the mothers in one site, there were long-term reductions in child abuse and neglect, reductions in subsequent pregnancies, increased economic self-sufficiency, and avoidance of substance abuse and criminal behavior. At age 15, the children had fewer arrests, convictions, and other negative outcomes. However, "the program produced few effects on children's development or on birth outcomes," and the other benefits were found for the neediest families rather than the broader population (Olds et al. 1999). The long-term effects of the program were documented with a white, semi-rural sample of women in New York State. A subsequent trial of the program with a cohort of African American women in a city in Tennessee showed a smaller short-term effect and a somewhat smaller 3-year follow-up effect of the program than demonstrated in the white, rural sample (Kitzman et al. 2000). In the HV2000 project, Olds et al. (2001) found that children of mothers visited by nurses (but not by paraprofessionals) scored higher on the Bayley MDI at 24 months and were less likely to have language delays at 21 months than the control group.

Project CARE tested the effectiveness of home-based parent education and social services with and without full-time, center-based child care. At 2 years of age, differences in language and cognitive development significantly favored the group that had received child care combined with family education, and these differences continued to 4 years of age (although somewhat lessened) (Wasik, Ramey, Bryant, and Sparling 1990). Project CARE compared two treatments (child care plus family support, family support only) with a no-services control group. The group with child care plus family support performed significantly better than both the other groups (Wasik et al. 1990). This study was conducted with an African American sample.

The Infant Health and Development Program (IHDP) combined home visiting, center-based education, and family services to low-birthweight premature infants and their families during the first three years of life. At age 3, the program group scored significantly higher on the Stanford Binet and lower in behavior problems. The heavier low-birthweight infants benefited more at ages 2 and 3 than did the very low-birthweight children (Brooks-Gunn, Klebanov, Liaw, and Spiker 1993). Effects were sustained through age 8 for the heavier low-birthweight children (McCarton et al. 1997).

The Comprehensive Child Development Program (CCDP) was implemented in 24 highly diverse sites beginning in 1989 and 1990. Programs featured intensive social services and parent education, although direct child development services and program-sponsored child care were far less intensive than in the IHDP and Abecedarian programs. When children were 2 years old, the national evaluation (conducted in 21 of the sites) found that CCDPs significantly improved (1) mothers' parenting skills and attitudes (for example, greater sensitivity to cues given by children in parent-child interactions and more appropriate responding to signals of distress), (2) parents' economic self-sufficiency, and (3) children's cognitive development (Bayley Scales of Infant Development) and social behavior (cooperation and following rules). (Language development at age 2 was not measured.) These effects largely disappeared by age 3 and were absent at age 5. At one site, however, significant and moderately large positive impacts were found at age 5 on children's cognitive development, parenting skills, and several self-sufficiency outcomes (St. Pierre, Layzer, Goodson, and Bernstein 1997).

In a secondary analysis of CCDP's 2- to 5-year impact data, Brooks-Gunn, Burchinal, and Lopez (2000) found that when sites were divided into two equal-size subgroups with more- and less-intensive parenting education (based on the average number of home visits families at each site received), the subgroup of programs with more-intense parenting education showed three important significant impacts relative to the control groups at those sites: (1) higher Bayley scores at age 2, (2) higher Kaufman Assessment Battery for Children (K-ABC) Achievement Scale scores at ages 3 to 5, and (3) higher Peabody Picture Vocabulary Test-R scores at ages 3 to 5. No impacts were found in the subgroup of sites where programs had less-intense parenting education.

Comparisons of the effects of home visiting and center-based programs are difficult to make. In a careful review, however, Benasich, Brooks-Gunn, and Clewell (1992) examined 27 studies and discovered that 90 percent of the center-based programs (compared with 64 percent of the home-based programs) produced immediate impacts on cognitive outcomes.

b. Building a Knowledge Base for Early Head Start

When they recommended Head Start services for infants and toddlers, the Head Start Quality and Expansion Panel and the Advisory Committee on Services for Families with Infants and Toddlers drew upon evidence of effectiveness in the existing research literature (including some of the findings cited here). The Advisory Committee on Services to Families with Infants and Toddlers consolidated knowledge from the research literature and from practice into nine principles to guide Early Head Start programs: (1) high quality; (2) prevention and promotion; (3) positive relationships and continuity; (4) parent involvement; (5) inclusion; (6) culture; (7) comprehensiveness, flexibility, responsiveness, and intensity; (8) transition; and (9) collaboration. These principles, along with the revised Head Start Program Performance Standards, set the stage for quality as they guided programs to implement specific practices (for example, low child-teacher ratios in relation to high quality).

Head Start advisory committees have called for research to understand the conditions under which programs are successful (and for whom programs can be more effective) and to promote continuous program improvement. The Early Head Start Research and Evaluation project, therefore, represents not only an evaluation of the initial years of the national Early Head Start program but an important step in expanding the Early Head Start knowledge base in very systematic ways. It attempts to do so by building in a number of features in response to the challenges of the new standards, guidelines, and principles and with the goal of overcoming shortcomings of previous studies. These features include:

- A comprehensive implementation study to provide data on the services specified in the revised Head Start Program Performance Standards that Early Head Start programs delivered
- Collection of extensive data on the services individual families received at specified intervals following random assignment, while also carefully and thoroughly documenting services received by control group families along the same dimensions and at the same intervals as the program families (see Chapter IV)
- Documenting the overall impacts of Early Head Start on children and families (see Chapter V) and conducting analyses that take participation rates into account in testing for program impacts
- Conducting subgroup analyses to examine the extent to which different program approaches have different kinds of effects on Early Head Start's children and families (as described in Chapter VI)
- Conducting subgroup analyses to examine the relationship between levels of program implementation and the impacts achieved (Chapter VI)
- Conducting subgroup analyses to learn how the effectiveness of Early Head Start may differ according to the characteristics of the families being served (Chapter VII)
- Collecting data directly from Early Head Start and control group fathers to learn more about the role of fathers and father figures in the lives of programs and families (highlighted in boxes in Chapters IV, V, and VII.)
- Incorporating local research, as well as other local documentation (including from program staff), to supplement the cross-site national data collection and analysis (highlighted in boxes throughout this volume, with more-detailed reports in Volume III)

In addition, a longitudinal follow-up study is currently underway, as the first Early Head Start "graduates" began preschool in fall 2000.

C. RESEARCH QUESTIONS ADDRESSED IN THE EARLY HEAD START IMPACT STUDY

1. Central Questions of the Study

The national evaluation has two overarching goals: (1) understanding the extent to which the Early Head Start intervention can be effective for infants and toddlers and their low-income families, and (2) understanding what kinds of programs and services can be effective for children and families with different characteristics living in varying circumstances and served by programs with varying approaches. The study was designed to address several key questions:

- How do Early Head Start programs affect child, parent, and family outcomes?
- How do different program approaches and community contexts affect these outcomes?
- How do program implementation and services affect outcomes?
- How do the characteristics of children and families affect outcomes?

These broad questions are translated into more specific research questions as we approach the analysis of impacts on services, children, parenting, and families (and are presented within the appropriate chapters).

2. Conceptual Framework

Like its older sibling Head Start, Early Head Start has the ultimate goal of promoting children's "competence," in the fullness of Zigler's original definition—children's "everyday effectiveness in dealing with their present environment and later responsibilities in school and life" (Zigler 1973). Infants and toddlers, however, have unique qualities that are different from those of preschool-age children, including their period of rapid development and important developmental milestones (such as developing trust and language). Good nutrition and health are particularly important during the first three years of life, as are both emotional and cognitive stimulation. Infants and toddlers develop in the context of relationships, and interventions during this period typically focus on those relationships, especially the one between parent and child.

The five objectives of the Head Start performance measures also apply conceptually to infants and toddlers, even though they were designed for preschool-age children. The objectives describe both processes and outcomes of the program. One can visualize the conceptual framework as a pyramid, with program management and operations at the base, providing the foundation for delivering services, supporting child and family development, and creating the ultimate outcomes that support social competence (Administration on Children, Youth and Families 1998). The evaluation design (described in greater detail in Section E and in Chapter II) follows this overarching framework:

- The evaluation of Early Head Start began by documenting and analyzing program implementation to ascertain whether the research programs were well managed and had the potential for making a difference in the lives of children and families.
- We collected extensive data on program services for both program and control groups to determine the extent to which programs (1) provided children and families with the appropriate services, and (2) linked children and families to needed community services and resources.
- We then measured children's growth and development, along with their families' functioning and strengths and, by contrasting them with the same measures in control group children and families, assessed the impacts the 17 research programs are having at this early stage in their development.

3. Overarching Hypotheses

As described in Section D, Early Head Start programs strive to influence children's development, parenting, and family functioning through three main approaches (center-based, home-based, and mixed). Within these approaches, we see that programs may follow multiple pathways for achieving their outcomes. Although service delivery strategies are implemented in diverse ways, they reflect two primary pathways to achieving the ultimate enhanced development of infants and toddlers (these can also be thought of as alternative theories of change by which programs achieve their effects):

1. ***The direct child pathway,*** for which we hypothesize that impacts on children's development will be either more probable or stronger than impacts on parenting, parent-child interactions, and family functioning. Programs emphasizing this pathway work with children and families primarily through child development centers. Caregivers interact directly with children to establish relationships, and

conduct activities designed to enhance children's health and their cognitive, social-emotional, and physical development. These programs also support families through social services, parent education, and parent involvement, but most services are child-focused.

2. ***The indirect child pathway through parenting and parent-child relationships,*** for which we hypothesize that impacts on parenting, parent-child relationships, and family functioning will be more common or stronger than the impacts on children's development, at least during the first two years of life. We hypothesize that child development impacts will manifest themselves somewhat later than through the direct child pathway. Programs emphasizing this pathway work with children and families primarily through home visiting (combined with social supports and group socialization activities). Home visitors interact with parents with the aim of strengthening the parent-child relationship, enhancing parenting skills, and supporting their efforts to provide an educationally stimulating and emotionally responsive home environment. These activities are then expected to lead to changes in children's health, cognitive, social-emotional, and physical development.

Programs may follow multiple pathways for achieving their desired outcomes. In practice, their emphasis on each pathway varies. Hypothesized impacts depend on the balance adopted by the particular program, that is, whether it takes (1) predominantly a direct child pathway, with some parent and parent-child focus in the services offered (center-based programs); (2) predominantly an indirect pathway through parenting, with some direct child services added (home-based); or (3) a balance of these two pathways (mixed approach). Program impacts may also vary depending on the emphasis placed on the indirect pathways through family support. Programs whose theory of change follows either a direct or an indirect path to child development also strive to strengthen family self-sufficiency and resources so that parents are better able to provide emotional and educational stimulation for their children and to interact with them in positive ways.

In general, programs that emphasize creating a balance of both direct and indirect pathways would be expected to have stronger impacts on parenting and family outcomes than programs that emphasize the direct child pathway. They would also be expected to have stronger child development outcomes than programs that emphasize the indirect pathway through parenting.

Because little research has been conducted with programs that emphasize both pathways, the Early Head Start evaluation examines more than one hypothesis. Programs emphasizing both pathways (the mixed-approach programs) may have more flexibility to respond to the varying needs of families, by providing predominantly home visiting, predominantly center care, or a mixture of the two that is tailored to the needs of the individual family. This flexibility may create a synergy that leads to effects greater than the effects of either of the two approaches alone. On the other hand, it is possible that in the short term, some dilution in both child and parent/family impacts could occur if emphasizing both pathways stretches the program's resources or creates complex operational challenges.

In the context of this basic conceptual framework, Chapters V and VI(which describe program impacts on children, parenting, and families overall and for programs taking different approaches) begin with a discussion of hypothesized effects in each outcome area.

D. THE EARLY HEAD START PROGRAMS, FAMILIES, AND COMMUNITIES

The Early Head Start Research and Evaluation project was carried out in 17 sites that were purposively selected as generally reflective of all the Early Head Start programs funded during the first two funding cycles of Early Head Start. In the following subsections, we describe the types of approaches the research programs followed in delivering Early Head Start services, the families the programs served, the communities where the research programs operated, and how the research programs compared with all Early Head Start programs funded in Waves I and II. In Chapter 2, in the context of the study methodology, we provide a more in-depth discussion of how the research sites were selected.

1. The 17 Early Head Start Research Programs

Unlike some programs, Early Head Start does not embrace a particular program "model," but asks each grantee to select service delivery options that will best meet the needs of the families and communities it serves. The period of dynamic change since the beginning of Early Head Start has provided ample opportunity for program adaptations over time. Each program has strived to implement the revised performance standards, find the approach (or mix of approaches) that will continue to meet changing family needs, and strengthen strategies that will promote children's development. Early Head Start programs try to meet families' and communities' needs through one or more official program options: (1) home-based, (2) center-based, (3) combination (in which families receive both home visits and center experiences), and (4) locally designed.

Because a *program* may offer multiple options, we characterized programs for research purposes according to the options they offer *families:*

- Center-based programs, which provide all services to families through the *center-based option* (center-based child care plus other activities) and offer a minimum of two home visits a year to each family
- Home-based programs, which provide all services to families through the *home-based option* (weekly home visits and at least two group socializations a month for each family)
- Mixed-approach programs, which provide services to some families through the *center-based option* and to some through the *home-based option,* or provide services to families through the *combination* or *locally designed option* (services can be mixed in the sense of programs targeting different types of services to different families or in the sense that individual families can receive a mix of services either at the same time or at different times; thus, in different ways, programs adjust the mix of home- and center-based services to meet the needs of families); these programs may also include child care provided directly by the Early Head Start program or through partnerships with community child care providers.

The 17 programs selected to participate in the national Early Head Start Research and Evaluation Project include 16 Wave I programs (the 68 programs funded in 1995) and 1 of the 75 Wave II programs funded in 1996. They are located in all regions of the country and in both urban and rural settings, and include all major Early Head Start program approaches. The families served are highly diverse, as described later.

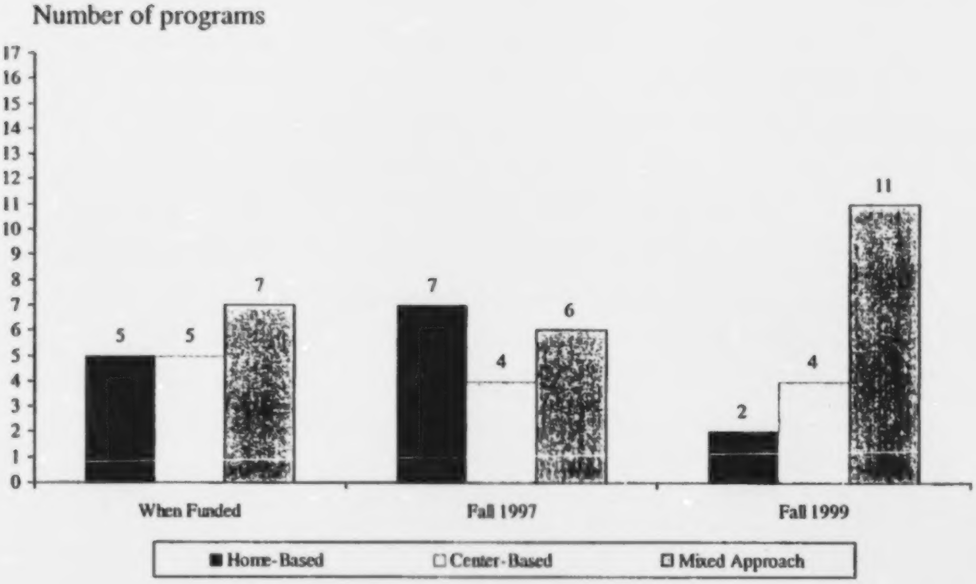
When funded, the research programs were about equally divided among the three program approaches (Figure I.2). By fall 1997, the home-based approach predominated, having increased from five to seven programs (four were center-based and six were mixed-approach in fall 1997). Program approaches continued to evolve, and by fall 1999, most home-based programs had become mixed-approach.

This evolution in program approaches occurred as programs responded to changing family needs, particularly the increasing need for child care. Some programs changed their approaches in fundamental ways; others significantly altered services within their basic approach. Details of this evolution are described in the *Pathways to Quality* report, but we summarize key changes here. Comparing programs in 1997 and 1999 (the two periods in which we obtained detailed implementation data from site visits), we see that:

- The four programs that had a center-based approach in 1997 remained center-based throughout but enhanced their programs in a variety of ways, such as achieving NAEYC accreditation; strengthening staff development; adding more classrooms; reducing group sizes; making changes that promoted greater continuity of care; collaborating more closely with welfare-to-work case managers; and expanding health, nutrition, and mental health services.
- Two of the seven home-based programs continued to provide home-based services to all families while adding enhanced support for families' efforts to use good-quality child care.

FIGURE I.2

THE EVOLUTION OF PROGRAM APPROACHES OVER TIME



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- Five of the seven home-based programs expanded services options to such an extent that by fall 1999 they had become "mixed" in their approach to serving families. The changes included (1) helping families find good child care and paying for quality child care that some home-based families used, (2) adding a child care center to serve a small portion of the enrolled families for whom the home visiting approach was not appropriate, (3) working with community partners to improve community child care, (4) visiting children in their child care settings as well as in their homes, and (5), in some cases, contracting with community child care partners for center-based services that met the Head Start performance standards.
- The six mixed-approach programs continued taking a mixed approach, but by 1999 they had expanded some service options, including obtaining state funding to enhance the program's ability to provide child care assistance, increasing home visit time spent on parent-child activities, taking formal steps to ensure that child care providers used by Early Head Start families met the revised Head Start Program Performance Standards, adding child care classrooms, and forming collaborations with state child care administrators.

Research programs varied along a number of dimensions that provide important context for their evaluation. One dimension is the variety of experiences programs brought to their new mission as Early Head Start grantees. Nine of the grantees had operated Head Start programs (four of these had not offered infant-toddler services before); one had previously operated a Parent Child Center (PCC) as well as Head Start; seven had been Comprehensive Child Development Programs (CCDPs) (five of these were new to Head Start but had served infants and toddlers); and three of the grantees without Head Start, PCC, or CCDP experience had operated other community-based programs. Many of the grantee agencies had experience offering infant-toddler services.

2. The Families That Early Head Start Research Programs Served

Table I.1 displays key characteristics of the 1,513 Early Head Start families at the time they entered the research programs. At the time of enrollment, primary caregivers were diverse:[2]

- Early Head Start applicants (99 percent of whom were mothers) were on average 23 years old. The mean age across the programs ranged from 18 to 26. About 62 percent were first-time parents.
- One-fourth of the primary caregivers lived with a spouse. Slightly more than one-third lived with other adults, and a similar proportion lived alone with their children.
- Teenage parents headed slightly more than one-third of families enrolled in Early Head Start. The percentage ranged from 19 to 90 across the 17 programs.
- Overall, one-third of families were African American, one-fourth were Hispanic, and slightly more than one-third were white (with a small percentage in other groups). Twelve programs were relatively homogeneous, with two-thirds or more of the families representing a single racial/ethnic group (four programs enrolled predominantly African American families, three were predominantly Hispanic, and five were predominantly white); in five, the racial/ethnic composition was diverse.
- Overall, one-fifth of the Early Head Start primary caregivers did not speak English as their primary language, although in two programs more than half reported not speaking English well.
- Nearly half the Early Head Start primary caregivers did not have their high school diploma at the time they enrolled (however, in four programs, two-thirds were high school graduates, and in three programs two-thirds were not).
- At enrollment, 45 percent of primary caregivers were employed or in school or training.
- Most families were receiving public assistance of some kind (77 percent were covered by Medicaid, 88 percent were receiving WIC benefits, almost half were receiving food stamps, just over one-third were receiving AFDC or TANF, and 7 percent were receiving SSI benefits).

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[2] We describe program and family characteristics at the outset of the study based on data from the Head Start Family Information System (HSFIS) application and enrollment forms that families completed at the time of application to the program. Programs submitted these forms to MPR for random assignment, and the date of the families' random assignment is used as the starting point for considering the timing of services and events captured by the evaluation. In most cases, program enrollment occurred within a month of random assignment.

TABLE I.1

KEY CHARACTERISTICS OF FAMILIES ENTERING THE EARLY HEAD START RESEARCH PROGRAMS

	All Research Programs Combined (Percentage)	Range Across Research Programs (Percentage)
Primary Caregiver (Applicant) Is Female	99	97 to 100
Primary Caregiver Is a Teenager (Under 20)	39	19 to 90
Primary Caregiver Is Married and Lives with Spouse	25	2 to 66
Primary Caregiver's Race/Ethnicity		
African American	34	0 to 91
Hispanic	24	0 to 90
White	37	2 to 91
Other	5	0 to 14
Primary Caregiver's Main Language Is Not English	20	0 to 81
Primary Caregiver Does Not Speak English Well	11	0 to 55
Primary Caregiver Lacks a High School Diploma	48	24 to 88
Primary Caregiver's Main Activity		
Employed	23	11 to 44
In school or training	22	4 to 64
Neither employed nor in school	55	24 to 78
Primary Caregiver Receives Welfare Cash Assistance (AFDC/TANF)	36	12 to 66
Number of Applicants/Programs	**1,513**	**17**

SOURCE: Head Start Family Information System application and enrollment data.

- Approximately one-fourth of primary caregivers enrolled while they were pregnant. The percentage that were pregnant ranged from 8 to 67 percent across the programs.
- HSFIS items relating to families' needs and resources indicated that the greatest self-reported needs of parents were for adequate child care (34 percent of families overall, ranging from 11 to 68 percent across the programs); transportation (21 percent, ranging from 12 to 35); and medical care (14 percent overall, ranging from 3 to 36 percent).

To supplement the baseline data available through the HSFIS, several local research teams worked with their program partners to collect information about their families that would provide a richer understanding of their characteristics. Eight teams obtained comparable maternal mental health data using the CES-D (Center for Epidemiological Studies Depression) scale, which provides information on the mothers' risk for depression. Across these eight programs, on average, 48 percent of parents scored in the at-risk range; this percentage ranged from 34 to 73 percent across the eight programs.

To be eligible for the research, the primary caregiver in the research program families had to be pregnant or have a child younger than 12 months of age. About 25 percent of the families enrolled while the mother was pregnant. The Early Head Start children who were born by the time of enrollment had diverse characteristics:

- They varied in age, with almost half under 5 months.
- Sixty-one percent were firstborn children.
- About 10 percent were low birthweight (under 2,500 grams), although the figure was 24 percent in one program.
- About 20 percent might have had—or were at risk for—a developmental disability.[3]

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[3] This percentage is an estimate. In Chapter III, we present information that the primary caregivers supplied approximately 6, 15, and 26 months after random assignment. The HSFIS contains more detailed data about the health and developmental conditions that are often associated with diagnoses of disabilities in young children.

3. The Communities Served by Early Head Start Research Programs

The 17 research programs are distributed across the major regions of the country—six in the West, four in the Midwest, four in the Northeast or Mid-Atlantic, and three in the South. About half are in urban areas and half in small towns or rural areas, with home-based, center-based, and mixed-approach programs in each. Most programs are located in areas of low unemployment (the median 1998 unemployment rate was 3.8 percent, and, the national unemployment rate was about 4.5 percent). Four of the research programs are in cities or areas where unemployment exceeded 5.5 percent in 1998; the rates across those sites ranged from 5.5 to 10.4 percent. In these communities with higher unemployment rates, staff described job and job-training opportunities as inadequate.

Welfare reform influenced the community context in several ways. One key factor affecting Early Head Start families was whether or not the state (or, in some cases, the county) exempted mothers of infants under 12 months of age from the work requirements. Seven of the research programs operated in areas where there was no exemption. In these areas, mothers were expected to enter the workforce when their babies reached ages ranging from 6 weeks to 9 months.

A few programs described their communities as "service rich," yet all identified some services for low-income families that were inadequate or lacking. As Chapter IV documents, families in the control group, who did not have the benefits of Early Head Start, generally received substantially fewer services. During implementation study visits, staff reported the major service inadequacies in communities to be lack of affordable and high-quality child care, insufficient affordable housing, and poor public transportation.

4. How Early Head Start Research Programs Compare with All Funded Programs from Which They Were Selected

The 17 selected research programs reflect the populations served by all Wave I and II programs from which they were selected (Table I.2).[4] For example:

- The average number of families enrolled in the research programs (85) is very similar to the number in Wave I (81) and Wave II (84) programs.
- The racial/ethnic distribution is similar, but the research programs have a slightly larger percentage of African American families and a slightly smaller percentage of white families.
- The percentage of single- and two-parent families in the research programs is similar to the average percentage in the Wave I and II programs.
- About the same percentage of primary caregivers are in school or training.

Although the findings reported in subsequent chapters are not statistically generalizable to all Early Head Start programs because they were not randomly selected (see Chapter II), they are relevant to the rest of the programs because (1) the research sites include the full range of locations and program approaches, (2) the families served by the research programs resemble the families served by other Wave I and II programs, and (3) the research sites encompass variations on other key dimensions that ACYF considered in funding Early Head Start programs (e.g., variations in race/ethnicity of families served, former auspice, experience serving infants and toddlers directly, and years in operation). Thus, the lessons drawn from the experiences of these programs are likely to be applicable to the others.

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[4] This analysis compared family characteristics of the 17 research programs with those of all Wave I and II programs using the ACYF Program Information Report (PIR) database.

TABLE I.2

COMPARISON OF RESEARCH PROGRAMS AND WAVE I AND II PROGRAMS

	Wave I Programs (Percentage)	Wave II Programs (Percentage)	Research Programs (Percentage)
Total ACYF-Funded Enrollment			
10 to 29 children	6	0	0[a]
30 to 59 children	14	9	6
60 to 99 children	62	64	65
100 to 199 children	15	27	29
200 to 299 children	3	0	0
(Average)	(81)	(84)	(85)
Race/Ethnicity of Enrolled Children			
African American	33	21	34[a]
Hispanic	22	27	24
White	39	46	37
Other	6	5	5
English Is the Main Language	85	79	80
Family Type			
Two-parent families	39	46	40
Single-parent families	51	46	52
Other relatives[b]	7	5	3
Foster families	1	1	0
Other	1	1	5
Employment Status[c]			
In school or training	20	22	22
Not employed	48	48	55
Number of Programs	**66**	**11**	**17**

SOURCE: Program Information Report data (columns 1 and 2) and Head Start Family Information System application and enrollment data (column 3).

NOTE: The percentages for the Wave I and II Early Head Start programs are derived from available Program Information Report (PIR) data. The percentages for the Early Head Start research programs are derived from Head Start Family Information System application and enrollment data from 1,513 families.

Percentages may not add up to 100, as a result of rounding.

[a] The data for the research programs refer to families instead of children.

[b] The HSFIS data elements and definitions manual instructs programs to mark "other relatives" if the child is being raised by relatives other than his/her parents, such as grandparents, aunts, or uncles, but not if the child is being raised by his/her parents and is living with other relatives as well.

[c] The research program data and PIR data are not consistent in the way that they count primary caregivers' employment status, so it is not possible to compare the percentage of caregivers who are employed.

E. OVERVIEW OF THE EVALUATION

1. Description of the Evaluation

The National Early Head Start Research and Evaluation Project is a cross-site national study conducted by Mathematica Policy Research, Inc. (MPR) and Columbia University's Center for Children and Families at Teachers College, in collaboration with the Early Head Start Research Consortium (staff of the 17 research programs, local researchers, and federal staff). All together, the study encompasses the following components:

- ***Implementation Study.*** Issues related to program implementation have been addressed in the Early Head Start implementation study and reported in two sets of reports; see *Leading the Way* (Administration on Children, Youth and Families 1999, 2000a, 2000b) and *Pathways to Quality* (Administration on Children, Youth and Families 2002).
- ***Continuous Program Improvement.*** Throughout the evaluation, reports and presentations have provided new information that all Early Head Start programs can use to enhance their ability to meet their families' needs.
- ***Impact Evaluation.*** Program impacts are the focus of this report and of the interim report, *Building Their Futures (*Administration on Children, Youth and Families, 2001) .
- ***Local Research Studies.*** Elements of these are integrated in this report, in boxes throughout the chapters of this volume and in Volume III. The local university research and program teams will report other local findings independently.
- ***Special Policy Studies.*** These include studies of issues relating to welfare reform, children's health, child care, and fatherhood. Key findings from the Early Head Start Father Studies are presented in this report. Special reports on child care and on children's health will be issued separately, as will additional reports focused on particular issues related to father involvement.

The impact analyses (reported here) focus on program impacts on children and families; analyses of outcomes in the staff and community development areas are reported in the *Pathways to Quality* implementation report (Administration on Children, Youth and Families 2002). The study is grounded in an experimental design in which 3,001 families across the 17 program sites were randomly assigned to participate in Early Head Start or to be in the control group. The *impact analyses benefited from partnerships with 15* local research teams that contributed site-specific findings from local research and brought the perspectives of researchers and program staff at the local level to the interpretation of the cross-site impact findings.

2. The Early Head Start Research Consortium

Under its contract with ACYF, MPR worked with the local research teams, the program directors from the research sites, and ACYF to create the Early Head Start Research Consortium. Beginning in April 1996, shortly after the local research grants were awarded, the consortium met two or three times each year to review evaluation plans (including instruments, data collection procedures, and data analysis plans) and collaborate on various reporting and dissemination activities. As described in Appendix B, in all but one of the sites, local researchers were responsible for all data collection (conducted under subcontract to MPR). The consortium created several workgroups to carry out research activities related to special topics, such as welfare reform, fatherhood, disabilities, and child care. The evaluation reports (including this one and those listed on page ii) embody the spirit of collaboration, as committees of consortium members reviewed the plans for and early drafts of this report and local research and program partners contributed brief reports of local studies, which have been incorporated into this report. The consortium members and their member institutions are listed in Appendix A.

3. Overview of the Implementation Study and Its Findings

The national evaluation includes a comprehensive implementation study that measured the extent to which programs had become "fully implemented" in 1997 and 1999. The assessment of implementation was based on 24 selected key elements of the program guidelines and the revised Head Start Program Performance Standards, as described in *Leading the Way*

(Administration on Children, Youth and Families 1999 and 2000) and *Pathways to Quality* (Administration on Children, Youth and Families 2002). Data were collected in three rounds of site visits, and a panel of site visitors, national evaluation representatives, and outside experts, using a consensus-based approach, assessed the degree of implementation both overall and separately for the child and family development areas, as well as staff development, community partnerships, and some aspects of program management (see Appendix C).

One-third (six) of the programs were judged to be fully implemented overall by the fall 1997 implementation visits and continued to be fully implemented in late 1999 while still expanding the numbers of families served. We refer to these as the *early implementers.* By fall 1999, two-thirds of the programs were fully implemented. We refer to the six that reached this level after 1997 as the *later implementers.* The remaining five programs did not achieve ratings of "fully implemented" during the evaluation period. We refer to them as the *incomplete implementers,* all of which nevertheless made strides in particular program areas and, in fact, showed a number of strengths. In general, these programs were not rated as "fully implemented" in child development and health services but tended to have strong family development services.

As part of the implementation rating process, we also rated the degree of implementation of child development and health services, which included programs' efforts in (1) conducting developmental assessments, (2) individualizing child development services, (3) involving parents in child development services, (4) promoting group socializations, (5) providing child care that meets the performance standards, (6) supplying health services for children, (7) offering frequent child development services, and (8) providing services for children with disabilities. Eight programs achieved a rating of "fully implemented" in this area in 1997, a number that increased to nine by 1999.

In the area of implementing family partnerships, we considered programs' progress in (1) Individualized Family Partnership Agreements; (2) availability of services; (3) frequency of services; and (4) parent involvement in policymaking, operations, and governance. In fall 1997, 9 programs were rated as "fully" implemented in family partnerships; this increased to 12 programs by fall 1999.

The implementation study also assessed key aspects of the quality of both home- and center-based child development services. We assessed the quality of child care received by program families, including the care provided in both Early Head Start centers and other community child care settings. See *Pathways to Quality* for a detailed description of our assessment of these data (Administration on Children, Youth and Families 2002).[5] Assessments of the child care arrangements used by program families are based on both field staff observations of child care settings and data collected from program staff during site visits. Observations of child care settings were made in conjunction with the study's 14-, 24-, and 36-month data collection and included use of the Infant/Toddler Environment Rating Scale (ITERS)[6] and the Family Day Care Environment Rating Scale (FDCRS),[7] as well as observed child-teacher ratios and group sizes.

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[5] A special policy report on child care in Early Head Start will be produced in 2002 that includes a more extensive analysis of child care use and quality.

[6] The Infant/Toddler Environment Rating Scale (ITERS) (Harms, Cryer, and Clifford 1990) consists of 35 items that assess the quality of center-based child care. Each item is ranked from 1 to 7. A ranking of 1 describes care that does not even meet custodial care needs, while a ranking of 7 describes excellent, high-quality, personalized care.

[7] The Family Day Care Environment Rating Scale (FDCRS) (Harms and Clifford 1989) consists of 35 items that assess the quality of child care provided in family child care homes. Items in the FDCRS are also ranked from 1 to 7, with 1 describing poor-quality care and 7 describing high-quality care.

The quality of child care provided by Early Head Start centers during their first two years of serving families was good.[8] All nine programs that operated centers from the beginning scored above 4 (the middle of the minimal-to-good range) on the ITERS, with the average being 5.3 (in the good-to-excellent range). Observed child-teacher ratios (2.3 children per teacher in 1997-1998 and 2.9 children per teacher in 1998-1999) and average group sizes (5.3 children in 1997-98 and 5.9 in 1998-1999) were well under the maximum allowed by the revised Head Start Program Performance Standards (below 4.0 children per teacher and 8.0 children per group).

Children in programs that did not offer center care often attended child care in community settings. The quality of care received by Early Head Start children in community child care centers varied widely across sites, with average ITERS scores ranging from 2.9 (minimal) to 5.9 (good to excellent) in 1998-1999. Overall, the average ITERS score in community child care centers was 4.4 (minimal to good). Average FDCRS scores ranged from 2.0 (inadequate to minimal) to 4.5 (minimal to good) across sites in 1998-1999; the average FDCRS scores were 3.3 (minimal) in 1997-1998 and 3.5 (minimal to good) in 1998-1999. However, observed child-teacher ratios and group sizes were in most cases lower than those set by the Head Start performance standards for infants to 3-year-olds (3.3 children per teacher in 1997-1998 and 4.2 in 1998-1999). The average group size in the family child care settings that we were able to observe was 4.5 children in the first year and 4.8 children in the second year. Some of the community settings were formal partners of Early Head Start programs and agreed to follow the performance standards; in other cases, parents found community child care on their own.

In fall 1999, 12 of the research programs operated Early Head Start centers. Most of them received good or high ratings on several factors that may be responsible for child care quality—

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[8] Because response rates were low in some sites, we may not have information for a representative sample of Early Head Start children's child care arrangements.

curriculum, assignment of primary caregivers, and educational attainment of teachers. Among *all* research programs, between one-fourth and one-half received good or high ratings in monitoring and in training and support for child care providers.

Since the study was not able to observe home visits directly, we rated quality of child development home visits by considering program factors that are related to service quality. These included supervision, training, and hiring of home visitors; planning and frequency of home visits; and the extent to which staff reported that home visits emphasized child development and were integrated with other services. By fall 1999, 11 of the 13 programs that served some or all families in a home-based option received a good or high rating of quality, up from 9 programs in 1997.

The implementation study provided a solid foundation on which to build the impact evaluation. We learned that all programs were able to implement key features of the performance standards but that programs varied considerably in both their rate and completeness of implementing those standards. We learned much about the variation in services that programs following different approaches offered, and saw strengths and challenges in center-based, home-based, and mixed-approach programs. We also saw the great diversity in the families that the 17 Early Head Start programs served. These programmatic and family variations enabled the evaluation to learn much about what kinds of programs are effective, how variations in program strategies and implementation are associated with differential effectiveness, and how the programs are differentially effective for different types of families. After describing the evaluation's design and methods in the next chapter, we then report the findings—both overall and in relation to subgroups of programs and families—in Chapters III through VII.

II. EVALUATION DESIGN, DATA, AND ANALYTIC APPROACHES

ACYF designed a thorough and rigorous evaluation to examine the impacts of Early Head Start on key child and family outcomes. This chapter summarizes the study design, the data sources and outcome variables used in this report, and our approach to conducting the impact analysis.

A. STUDY DESIGN

The evaluation was conducted in 17 sites where Early Head Start research programs were located. Once selected for participation in the study, programs began enrolling families and worked with MPR staff to coordinate with the requirements of random assignment.

1. Site Selection

When the 68 Early Head Start programs in the first wave were funded in late 1995, they agreed, as a condition of funding, to participate in local and national research if selected to do so. In March 1996, 41 university research teams submitted proposals to the Head Start Bureau—in partnership with Wave I Early Head Start program grantees—to conduct local research and participate in the national evaluation. ACYF purposively selected 15 research sites, using a number of criteria: (1) programs had to be able to recruit twice as many families as they could serve; (2) programs had to have a viable research partner; and (3) in aggregate, programs had to provide a national geographic distribution that represented the major programmatic approaches and settings and reflected diverse family characteristics thought to be typical of Early Head Start families nationally. Applying these criteria resulted in fewer center-based programs than desired, so in 1996 ACYF selected one additional center-based program from Wave I, and in late

1997 selected another center-based program (without a local research partner) from Wave II programs (75 of which were funded in mid-1996), resulting in the full sample of 17 programs.

Because the 17 research programs were not randomly selected, the impact results cannot be formally generalized to all Early Head Start programs funded during 1995 and 1996. Instead, the results can be generalized only to the 17 programs themselves (that is, the impact results are internally valid). However, as shown in Chapter I (Table I.2), the features of the 17 programs, as well as the characteristics of their enrolled families and children, are similar to those of all Early Head Start programs in 1995 and 1996. Thus, to the extent that the quality and quantity of services offered in the 17 programs are similar to those offered nationwide, our findings about effective program practices and their impacts on children and families are likely to pertain to Early Head Start programs more broadly.

2. Sample Enrollment

Although Wave I grantees entered Head Start with varying degrees and types of experiences (see Chapter I), all had been asked not to enroll any families until it was decided whether they would be selected for the research sample. Because all programs had agreed, in submitting their original proposals, to participate in the random assignment process if they were selected for the research sample, it was not necessary to persuade any of the programs to cooperate. Thus, as soon as the programs were selected, beginning in spring 1996, MPR staff began working with their staffs to implement the random assignment process in conjunction with each program's regular enrollment procedures. Except for recruiting about twice as many families as they could serve, programs were expected to recruit as they would in the absence of the research, with special instructions to be sure to include all the types of families that their program was designed to serve (including those whose babies had disabilities). MPR and ACYF created detailed procedures (outlined in a "frequently asked questions" document—see Appendix E.II.A) to guide the sample enrollment process.

3. Random Assignment

As soon as programs determined through their application process that families met the Early Head Start eligibility guidelines, they sent the names to MPR, and we entered the names and identifying information into a computer program that randomly assigned the families either to the program or to the control group (with equal probabilities). Program staff then contacted the program group families, while representatives of the local research partners notified the control group families of their status.

Control group families could not receive Early Head Start services until their applicant child reached the age of 3 (and was no longer eligible for Early Head Start), although they could receive other services in the community. This ensures that our analytic comparisons of program and control group outcomes represent the effects of Early Head Start services relative to the receipt of all other community services that would be available to families in the absence of Early Head Start.

Some program staff were concerned that random assignment might, by chance, result in denial of services to families with particularly high service needs. ACYF was very clear, however, that the study findings should pertain to all families and children that Early Head Start was designed to serve, including infants and toddlers with disabilities. To address program concerns, however, ACYF and MPR established a process by which programs could apply to have a family declared exempt from participating in the research. ACYF received only one request for an exemption, and it was not considered to be warranted.

Sample enrollment and random assignment began in July 1996 and were completed in September 1998. In most sites, sample intake occurred over a two-year period, although some took less time. The extended enrollment period was due in part to the extra work involved in recruiting twice as many families as programs were funded to serve, and in part to the process of new programs working out their recruitment procedures. Two programs completed sample enrollment in late 1997, and one (the 17th site) did not begin sample intake until fall 1997. Thus, the study population for the evaluation includes Early Head Start-eligible families who applied to the program between late 1996 and late 1998.

During the sample intake period, 3,001 families were randomly assigned to the program (1,513) and control (1,488) groups (Table II.1). The samples in most sites include between 150 and 200 families, divided fairly evenly between the two research groups.

Early Head Start staff implemented random assignment procedures well. We estimate that about 0.7 percent of all control group members received any Early Head Start services (that is, were "crossovers"), and most sites had no crossovers.[1] Furthermore, our discussions with site staff indicate that information on nearly all eligible families who applied to the program during the sample intake period was sent to MPR for random assignment. Program staff did not provide Early Head Start services to families who were not submitted for random assignment. Hence, we believe that the research sample is representative of the intended study population of eligible families, and that any bias in the impact estimates due to contamination of the control group is small.

Random assignment yielded equivalent groups: the average baseline characteristics of program and control group members are very similar (Appendix D). This is as expected, because MPR used computer-generated random numbers to assign families. Therefore, the only

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[1] Site staff reported that 10 control group families in 5 programs received Early Head Start services. One program had 4 crossovers, one program had 3 crossovers, and 3 programs had 1 crossover each.

TABLE II.1

EVALUATION SAMPLE SIZES, BY SITE AND RESEARCH STATUS

Site	Program Group	Control Group	Combined Sample
1	74	77	151
2	93	86	179
3	84	78	162
4	75	72	147
5	74	76	150
6	115	110	225
7	104	108	212
8	98	98	196
9	98	95	193
10	71	70	141
11	104	96	200
12	73	79	152
13	104	98	202
14	75	71	146
15	90	92	182
16	95	95	190
17	86	87	173
All Sites	**1,513**	**1,488**	**3,001**

NOTE: Sites are in random order.

difference between the two research groups at random assignment was that the program group was offered Early Head Start services and the control group was not. Thus, differences in the subsequent outcomes of the two groups can be attributed to the offer of Early Head Start services with a known degree of statistical precision.

B. DATA SOURCES AND OUTCOME MEASURES

Comprehensive data from multiple sources were used to examine the effects of Early Head Start participation on a wide range of child, parenting, and family outcomes. This section provides an overview of data sources and outcome measures used for the analysis, the response rates to the interviews and assessments, and the timing of interviews. These topics are discussed in greater detail in the Appendixes.

1. Data Sources

The follow-up data used for the analysis were collected at time points based on (1) the number of months since random assignment, and (2) the age of the focus child. Each family's use of services and progress toward self-sufficiency were seen as likely to be a function of the amount of time since the family applied for Early Head Start services. Therefore, these data were collected at selected intervals following random assignment. Other data—particularly those related to child and family development—were more likely to be a function of the increasing age of the focus child over time. Thus, the data collection schedule for these developmental outcomes was tied to children's birth dates. The data sources used in this report include:

1. ***Parent Services Follow-Up Interview (PSI) Data Targeted for Collection 6, 15, and 26 Months After Random Assignment.*** These data contain information on (1) the use of services both in and out of Early Head Start (such as the receipt of home visits, and of services related to case management, parenting, health, employment, and child care); (2) progress toward economic self-sufficiency (such as employment, welfare

receipt, and participation in education and training programs); (3) family health; and (4) children's health. Most PSIs were conducted by telephone with the focus child's primary caregiver, although some interviews were conducted in person for those not reachable by phone.

2. ***Exit Interview When Children Reached 36 Months of Age.*** These interviews were conducted only with program group families when their children were 36 months old and had to transition out of Early Head Start. The exit interviews obtained information on the use of services in Early Head Start. Whenever possible, the interviews were conducted in conjunction with the 36-month parent interviews (see below), but in some cases were conducted in conjunction with the 26-month parent services interviews.

3. ***Parent Interview (PI) Data Targeted for Collection When Children Were 14, 24, and 36 Months Old.*** These interviews obtained a large amount of information from the primary caregivers about their child's development and family functioning. These data usually were collected in person, but some PIs or portions of them were conducted by telephone when necessary.

4. ***Child and Family Assessments Targeted for Collection When Children Were 14, 24, and 36 Months Old.*** Field interviewers provided data on their observations of children's behavior and home environments. Interviewers conducted direct child assessments (such as Bayley assessments) and videotaped structured parent-child interactions. Several measures constructed using these data overlap with those constructed from the PI data, which allowed us to compare impact findings using the two data sources.

5. ***Father Interviews Targeted for Collection When Children Were 24 and 36 Months Old.*** In addition to asking mothers about the children's father, we interviewed the men directly about fathering issues at the time of the 24- and 36-month birthday-related interviews.[2] The father study was conducted in 12 sites only. Father observational data were collected in 7 sites.

6. ***Baseline Data from the Head Start Family Information System (HSFIS) Program Application and Enrollment Forms.*** We used these forms, completed by families at the time of program application, to create subgroups defined by family characteristics at baseline, and to adjust for differences in the characteristics of program and control group members when estimating program impacts. We also used the forms to compare the characteristics of interview respondents and nonrespondents, and to construct weights to adjust for potential nonresponse bias.

7. ***Baseline Data from Selected Sites on Mother's Risk of Depression.*** Local researchers in eight sites administered the Center for Epidemiologic Studies Depression Scale (CES-D) at baseline. These data were used in the subgroup analysis

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[2] The father study is supported with funding from the National Institute of Child Health and Human Development, the Ford Foundation, ACYF, and the Office of the Assistant Secretary for Planning and Evaluation.

to assess whether impacts differed for mothers at risk of depression and for those who were not.

8. ***Data from the Implementation Study.*** Finally, the analysis used data from the implementation study to define subgroups based on program characteristics (such as program approach and level of program implementation) and site characteristics (such as urban or rural status and welfare regulations).

MPR prepared all the follow-up data collection instruments and trained all field staff. In all sites but one (where MPR collected the data), data collection field staff were hired by the local research teams, who were responsible, under subcontract to MPR, for collecting the data and monitoring data quality. Respondents were offered modest remuneration and a small gift to complete each set of interviews and assessments. Appendix B describes the data collection procedures in greater detail. Details about all the measures can be found in Chapter V and in Appendix C.[3]

It is important to recognize that linking PIs and child and family assessments to the age of the child, rather than to a fixed period after random assignment, means that at the time those instruments were administered, families were exposed to the program for different lengths of time. Nevertheless, questions about children's development at particular ages are policy relevant. It is also of policy interest, however, to assess impacts for children and families with similar lengths of exposure to the program. Therefore, as described in Section C, we estimated impacts by doing subgroup analyses based on the child's age at random assignment (so that program exposure times would be similar within each age group).

It is also important to recognize that at the 14-month birthday-related interviews, many families had been exposed to Early Head Start for only a short time, and especially so for families with older focus children. Thus, we did not expect impacts to appear at 14 months. In this report, we focus on the child, parenting, and family outcomes when children are 2 and 3 years old.

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[3] Early Head Start evaluation data on the quality of child care used by families in the sample will be the subject of a special policy report.

In sum, in this report we present impact findings using follow-up data from the 6-, 15-, and 26-month PSIs, from the exit interview, and from the 14-, 24-, and 36-month PIs and child and family assessments. Thus, our impact findings cover the first three years of the focus children's lives. A longitudinal study is underway that will follow and interview program and control group families just before the focus children enter kindergarten to assess the longer-term effects of Early Head Start.

2. Response Rates

Table II.2 displays overall response rates for key data sources by research status,[4] as well as response rates for various combinations of interviews. Interview respondents are sample members who provided data that could be used to construct key outcome variables. Nonrespondents include those who could not be located, as well as those who could be located but for whom complete or usable data were not obtained (Appendix B).

Response rates were higher for the PSIs and the PIs than for the Bayley and video assessments. Furthermore, as expected, response rates decreased somewhat over time. The rate was about 82 percent to the 6-month PSI, 75 percent to the 15-month PSI, and 70 percent to the 26-month PSI. It was 78 percent to the 14-month PI, 72 percent to the 24-month PI, and 70 percent to the 36-month PI. At 14 months, it was 63 percent to the Bayley assessment and 66 percent to the video assessment, while at 36 months, it was about 55 percent to each. About 57 percent of sample members completed all three PIs, 39 percent completed all three video

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[4] Response rates to the father interviews are discussed in Appendix B.

TABLE II.2

RESPONSE RATES TO KEY DATA SOURCES
(Percentages)

Data Source	Program Group	Control Group	Combined Sample
Parent Service Interviews (PSIs)			
6-Month	83.9	79.3	81.6
15-Month	76.1	74.4	75.2
26-Month	71.1	67.9	69.5
15- and 26-Month	63.0	59.9	61.5
All three	58.6	54.4	56.5
Parent Interviews (PIs)			
14-Month	79.1	77.1	78.1
24-Month	73.9	70.4	72.2
36-Month	73.2	67.4	70.3
24- and 36-Month	64.4	58.2	61.4
All three	59.4	53.9	56.7
Bayley Assessments			
14-Month	64.2	61.2	62.7
24-Month	61.5	57.1	59.4
36-Month	58.1	52.4	55.3
24- and 36-Month	46.5	40.6	43.6
All three	37.0	32.6	34.8
Video Assessments			
14-Month	66.5	65.2	65.8
24-Month	62.2	57.5	59.9
36-Month	57.8	52.7	55.3
24- and 36-Month	48.1	42.7	45.4
All three	40.8	37.0	38.9
Combinations			
PSI 15 and PI 24	65.6	63.2	64.4
PSI 26 and PI 36	63.9	58.7	61.3
PI 24 and Bayley 24	60.5	56.5	58.6
PI 24 and Video 24	61.5	57.1	59.4
Bayley 24 and Video 24	55.9	51.9	53.9
PI 24, Bayley 24, and Video 24	55.4	51.5	53.5
PI 36 and Bayley 36	57.4	52.0	54.7

TABLE II.2 (*continued*)

Data Source	Program Group	Control Group	Combined Sample
PI 36 and Video 36	57.4	52.4	54.9
Bayley 36 and Video 36	53.2	47.9	50.6
PI 36, Bayley 36, and Video 36	52.8	47.6	50.2
PI 24 and Bayley 36	52.2	46.0	49.2
PI 24 and Video 36	52.4	47.0	49.7
Video 24 and PI 36	55.8	48.8	52.3
Video 24 and Bayley 36	47.2	40.9	44.1
Sample Size	**1,513**	**1,488**	**3,001**

assessments, and 35 percent completed all three Bayley assessments.[5] The percentages who completed both the 24- and 36-month interviews were about 5 percentage points higher than those who completed all three interviews.[6]

Importantly, response rates were similar for program and control group members for all data sources. Although response rates were consistently 2 to 6 percentage points higher for the program group, this differential did not result in any attrition bias, as the following analyses demonstrate.

In general, the same families responded to the different interviews (Table II.2). For example, among those who completed a 36-month PI, about 87 percent completed a 24-month PI, and 81 percent completed both a 14- and 24-month PI. Similarly, among those who completed a 36-month video assessment, about 99 percent also completed a 36-month PI, and about 92 percent also completed a 36-month Bayley assessment.

Response rates differed across sites (Table II.3). The rate to the 26-month PSI ranged from 55 percent to 81 percent, although it was 70 percent or higher in 11 sites. Similarly, response rates to the 36-month PI ranged from 51 percent to 81 percent; 12 sites had a rate greater than 70 percent, but 3 sites had a rate less than 60 percent (for the control group). The response rate to the 36-month Bayley and video assessments varied more, ranging from about 27 percent to 76 percent, with less than half the sites having a response rate greater than 60 percent. Response

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[5] The sample that completed all three interviews is used in the growth curve analysis as described later in this chapter.

[6] The sample that completed the 24- and 36-month interviews is used in the mediated analysis as described later in this chapter.

TABLE II.3

RESPONSE RATES TO THE 26-MONTH PSI, 36-MONTH PI AND 36-MONTH ASSESSMENTS, BY SITE
(Percentages)

	26-Month PSI			36-Month PI			36-Month Bayley			36-Month Video		
Site	Program Group	Control Group	Total	Program Group	Control Group	Total	Program Group	Control Group	Total	Program Group	Control Group	Total
1	86	73	79	86	77	81	78	65	72	84	69	76
2	62	62	62	70	57	64	55	41	48	60	44	53
3	76	77	77	76	77	77	56	53	54	62	59	60
4	60	61	61	88	67	78	65	54	60	72	56	64
5	76	67	71	80	64	72	61	36	48	59	45	52
6	54	57	56	65	65	65	49	46	48	45	42	44
7	62	69	65	51	52	51	46	46	46	35	40	37
8	80	83	81	82	72	77	63	56	60	68	62	65
9	58	52	55	53	49	51	40	35	37	27	27	27
10	61	60	60	61	64	62	61	57	59	58	59	58
11	79	68	74	69	73	71	53	55	54	55	53	54
12	79	61	70	75	67	71	52	46	49	45	46	45
13	74	73	74	82	70	76	60	57	58	65	60	63
14	67	73	70	68	79	73	47	65	55	47	54	50
15	73	75	74	77	76	76	59	62	60	57	63	60
16	78	74	76	77	74	75	75	71	73	74	71	72
17	91	71	81	94	68	81	78	49	64	81	54	68
Total	**71**	**68**	**70**	**73**	**67**	**70**	**58**	**52**	**55**	**58**	**53**	**55**

NOTE: Sites are in random order.

rates for the program group were substantially larger than those for the control group in some sites, although the reverse was true in a few sites.[7]

Table II.4 displays response rates for key subgroups defined by site and family characteristics at random assignment. The family subgroups were constructed using HSFIS data collected at the time of program application, which are available for both interview respondents and nonrespondents. Asterisks in the table signify whether differences in the variable distributions for respondents and the full sample of respondents and nonrespondents are statistically significant at the 10 percent level. We conducted separate statistical tests for the program and control groups. Appendix D presents detailed results from the nonresponse analysis.

We find some differences in response rates across groups of sites. Response rates for the *program* group were higher in the center-based programs than in the home-based and mixed-approach ones, although rates for the *control* group were more similar across program approaches. Thus, differences in response rates between the program and control groups were largest in the center-based programs. Interestingly, rates for both research groups were higher in sites that were fully implemented than in the incompletely implemented sites.

Response rates also differed across some subgroups defined by family characteristics. They increased with the education level of the primary caregiver. In addition, they were higher if the primary caregiver was employed at random assignment (for the program group), if she was married or living with other adults, and if the family was receiving welfare. Response rates were also slightly higher for whites than for African Americans and Hispanics for some data sources,

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[7] Appendix D.2 in the interim report displays response rates by site to the 15-month PSI and the 24-month PI and Bayley and video assessments. The 24-month findings are very similar to the 36-month ones.

TABLE II.4

RESPONSE RATES TO THE 26-MONTH PSI, 36-MONTH PI AND 36-MONTH ASSESSMENTS, BY SUBGROUPS DEFINED BY SITE AND FAMILY CHARACTERISTICS

(Percentages)

	26-Month PSI		36-Month PI		36-Month Bayley		36-Month Video	
Site	Program Group	Control Group	Program Group	Control Group	Program Group	Control Group	Program Group	Control Group
Site Characteristics								
Program Approach			*		*		*	*
Center-based	75	67	83	69	71	56	74	59
Home-based	69	67	71	66	56	52	56	51
Mixed	72	70	70	68	53	51	50	51
Overall Implementation Level	*	*	*	*	*		*	*
Early Implementers	70	71	74	69	58	58	59	56
Later Implementers	78	72	79	69	64	53	66	56
Incomplete Implementers	65	60	65	63	52	46	48	44
Family Characteristics at Random Assignment								
Mother's Age at Birth of Focus Child								
Less than 20	71	67	71	66	57	55	56	54
20 or older	71	69	74	69	58	51	59	52
Mother's Education	*	*	*	*				*
Less than grade 12	68	66	69	65	57	51	57	51
Grade 12 or earned a GED	73	67	78	66	59	51	62	50
Greater than grade 12	74	75	75	77	58	57	55	60
Race and Ethnicity	*		*	*	*		*	*
White non-Hispanic	71	70	78	73	59	57	60	59
Black non-Hispanic	73	67	70	66	56	48	53	48
Hispanic	70	67	73	62	62	52	63	54

Table II.4 (*continued*)

Site	26-Month PSI		36-Month PI		36-Month Bayley		36-Month Video	
	Program Group	Control Group	Program Group	Control Group	Program Group	Control Group	Program Group	Control Group
Welfare Receipt	*		*		*		*	*
Received welfare	66	65	68	66	54	50	54	48
Did not receive welfare	74	69	77	70	60	53	60	56
Primary Occupation			*		*		*	
Employed	75	66	80	68	67	52	66	55
In school or training	71	67	72	66	60	52	60	50
Neither	69	76	70	69	53	53	53	53
Primary Language				*				
English	70	69	73	70	57	54	57	54
Other	72	67	72	62	61	50	60	51
Living Arrangements		*					*	*
With spouse	73	72	76	72	56	54	59	57
With other adults	72	70	73	67	61	53	61	54
Alone	69	63	71	65	56	51	53	49
Random Assignment Date			*		*		*	
Before 10/96	70	66	72	66	56	51	56	51
10/96 to 6/97	71	71	69	68	54	54	53	54
After 6/97	72	67	78	68	64	51	64	53
Total	**71**	**68**	**73**	**67**	**58**	**52**	**58**	**53**

SOURCE: HSFIS, 26-month PSI, 36-month PI, 26-month Bayley, and 36-month video data.

*Difference between the variable distribution for interview respondents and the full sample of respondents and nonrespondents is statistically significant at the 10 percent level.

and for those randomly assigned later than earlier. The pattern of response rates across subgroups was similar for the program and control groups.

Importantly, we find fewer differences in the baseline characteristics of program and control group *respondents* (Appendix D). Very few of the differences in the distributions of the baseline variables for respondents in the two research groups are statistically significant for each data source. *None* of the p-values for testing the hypotheses that the distribution of the baseline variables are jointly similar are statistically significant. Thus, although we find some differences in the characteristics of respondents and nonrespondents, the characteristics of respondents in the two research groups appear to be similar.

Our main procedure to adjust for potential nonresponse bias was to estimate impacts using regression models that control for differences in the baseline characteristics of program and control group respondents (see Section C below). We used a large number of control variables from the HSFIS forms to adjust for observable baseline differences between the two groups. We gave each site equal weight in the analysis (regardless of the response rates in each site). In addition, as discussed in Appendix D, we calculated sample weights to adjust for nonresponse, so that the weighted characteristics of respondents matched those of the full sample of respondents and nonrespondents. We used these weights in some analyses to check the robustness of study findings (see Appendix D).

These procedures adjust for nonresponse by controlling for *measurable* differences between respondents and nonrespondents in the two research groups. To be sure, there may have been *unmeasured* differences between the groups. However, because of the large number of baseline data items in the HSFIS forms, we believe that our procedures account for some important differences between the groups. Therefore, we are confident that our procedures yielded meaningful estimates of program impacts.

3. Timing of Interviews

Most interviews were conducted near their target dates (Appendix B). For example, the average 15-month PSI was conducted 16.6 months after random assignment, and about 80 percent were conducted between 12 and 18 months. Similarly, the average 26-month PSI was conducted 28.4 months after random assignment, and about 76 percent were conducted within 30 months. The average 24-month PI was conducted when the child was 25.1 months old, and about 88 percent were conducted when the child was between 23 and 27 months old. The average 36-month PI was completed when the child was 37.5 months old, and about 82 percent were completed before the child was 40 months old. The corresponding figures for the Bayley and video assessments are very similar to those of the PIs.

On average, the 6-, 15-, and 26-month PSI interviews were conducted about 5 months before the 14-, 24-, and 36-month birthday-related instruments, respectively (Appendix B). Thus, at the 36-month birthday-related interviews and assessments, some families who remained in the program for a long period probably had received more Early Head Start services than we report here.

The distributions of interview completion times were similar for program and control group families. Thus, it is not likely that impact estimates on outcomes (such as the child language measures) were affected by differences in the ages of program and control group children at the time the data were collected.[8] As discussed in Appendix C, we did not have a pertinent norming sample to age-norm some measures.

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[8] To further test the age bias, we estimated impacts separately by the age of the child at interview completion by including in the regression models explanatory variables formed by interacting child's age with an indicator of whether the family is in the program group. These results indicate that the estimated impacts on key outcomes do not differ by the age of the child at interview completion (that is, the interaction terms are not statistically significant at the 5

4. Outcome Variables

The Early Head Start evaluation was designed to examine the extent to which Early Head Start programs influence a wide range of outcomes. Four main criteria guided specification of the major outcome variables for the analysis: (1) selecting outcomes that are likely to be influenced significantly by Early Head Start on the basis of programs' theories of change and the results of previous studies, (2) selecting outcomes that have policy relevance, (3) measuring outcomes reliably and at reasonable cost, and (4) selecting outcomes that could be reliably compared over time.

The primary outcome variables for the analysis can be grouped into three categories:

1. Service use
2. Child development and parenting
3. Family development

Table II.5 summarizes the key categories of outcome variables in each area, as well as the data sources used to construct them. In the analysis, we first describe the EHS experiences of program group members and examine impacts for the service use outcomes, because we would not expect meaningful impacts on the child, parenting, and family outcomes unless program group families received substantial amounts of Early Head Start services *and* received more and higher-quality services than the control group. Examining the services received by control group families is crucial for defining the counterfactual for the evaluation, and for interpreting impact estimates on all other outcomes. These results are presented in Chapter IV. Impact results for the child, parent, and family outcomes are presented in Chapters V, VI, and VII. A detailed

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(continued)
percent level). Thus, we are confident that the impact estimates are not biased due to age differences of the children at interview completion.

TABLE II.5

CATEGORIES OF OUTCOME VARIABLES REFERRED TO IN THIS REPORT, AND THEIR DATA SOURCES

Outcome Measure	Data Source
Service Use	
Home visits	6-, 15-, and 26-Month Parent Services Interviews
Case management	6-, 15-, and 26-Month Parent Services Interviews
Parenting-related services	6-, 15-, and 26-Month Parent Services Interviews
Child care and child development services	6-, 15-, and 26-Month Parent Services Interviews
Services for children with disabilities	6-, 15-, and 26-Month Parent Services Interviews
Child health services and status	6-, 15-, and 26-Month Parent Services Interviews
Family health and other family development services	6-, 15-, and 26-Month Parent Services Interviews
Father participation in program-related activities	36-Month Father Interview
Parenting Behavior, Knowledge, and the Home Environment	
Knowledge of child development, discipline strategies, and safety precautions	24- and 36-Month Parent Interviews
Parent supportiveness, detachment, intrusiveness, and negative regard	Coding from Videotaped Parent-Child Semistructured Play Task (24 and 36 Months)
Parent quality of assistance, detachment, and intrusiveness	Coding from Videotaped Puzzle Challenge Task (36 Months)
Parent warmth, harshness and stimulation of language and learning	24- and 36-Month Parent Interviews
Quality of cognitive and emotional support provided in the home environment	24- and 36-Month Parent Interviews and Interviewer Observations
Father Involvement	24- and 36-Month Parent Interviews
Child Development	
Child social and emotional well-being	
Child engagement, negativity toward parent, and sustained attention with objects	Coding from Videotaped Parent-Child Semistructured Play Task (24 and 36 months)
Child engagement, persistence, and frustration	Coding from Videotaped Puzzle Challenge Task (36 Months)
Emotional regulation, orientation/engagement	Interviewer Observations (24 and 36 months)
Aggressive behavior	24- and 36-Month Parent Interviews
Child cognitive and language development	
Bayley Mental Development Index (MDI)	Direct Child Assessment (24 and 36 months)
Vocabulary production and sentence complexity	24-Month Parent Interviews
Receptive vocabulary	Direct Child Assessment (36 Months)
Child Health Status	24- and 36-Month Parent Interviews

TABLE II.5 *(continued)*

Outcome Measure	Data Source
Family Outcomes	
Parent's Health and Mental Health	
Depression	24- and 36-Month Parent Interviews
Parenting stress	24- and 36-Month Parent Interviews
Family Functioning	
Family conflict	24- and 36-Month Parent Interviews
Self-Sufficiency	
Education and training	6-, 15, and 26-Month Parent Services Interviews
Welfare receipt	6-, 15, and 26-Month Parent Services Interviews
Employment and income	6-, 15, and 26-Month Parent Services Interviews
Father Presence, Behavior, and Well-Being	
Father presence	14-, 24-, and 36-Month Parent Interviews
Father caregiving, social, cognitive, and physical play activities	36-Month Father Interview
Father discipline strategies	36-Month Father Interview
Father supportiveness and intrusiveness	Coding from Videotaped Father-Child Semistructured Play Task (36 months)
Father quality of assistance and intrusiveness	Coding from Videotaped Father-Child Puzzle Challenge Task (36 months)
Father's Mental Health	
Depression	36-Month Father Interview
Parenting stress	36-Month Father Interview
Family Functioning	
Family conflict	36-Month Father Interview
Child Behavior With the Father	
Child engagement of the father, negativity toward the father, and sustained attention with objects	Coding from Videotaped Father-Child Semistructured Play Task (36-Months)
Child engagement of father, persistence, and frustration	Coding from Videotaped Father-Child Puzzle Challenge Task (36-Months)

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discussion of the specific outcome variables for the analysis, the reasons they were selected, and the way they were constructed can be found at the start of each chapter.

5. Analysis Samples

We used different analysis samples, depending on the data source and type of analysis. The primary sample used to estimate "point-in-time" impacts on outcomes from the 24-month or 36-month PI data includes those who completed 24-month or 36-month PIs. Similarly, the primary sample for the point-in-time analysis based on the birthday-related child and family assessment data includes those who completed the assessments at each time point. In sum, we conducted *separate* point-in-time analyses using each of these samples in order to maximize the sample available for the analyses.

The primary sample, however, used in the analysis to examine impacts on the growth in child and family outcomes (that is, the growth curve analysis) includes those for whom data are available for all three time points. Similarly, the primary sample used in the analysis to examine the extent to which impacts on mediating (24-month) variables correlate with impacts on longer-term (36-month) outcomes (that is, the mediated analysis) includes those for whom both 24-month and 36-month data are available.

For the analysis of the service use and self-sufficiency outcomes, we used the sample of those who completed 26-month PSIs (*regardless* of whether a 6- or 15-month PSI was completed). Most of the service use and self-sufficiency outcomes pertain to the entire 26-month period since random assignment (for example, the receipt of any home visits, the average hours per week the child spent in center-based child care, and the average number of hours the mother spent in education and training programs), so data covering the entire 26-month period were required to construct these outcomes. About 88 percent of those who completed a 26-month PSI also completed a 15-month PSI, and 97 percent completed either a 6-month or a 15-month PSI.

In the 26-month PSI, respondents were asked about their experiences since the previous PSI interview (or since random assignment if no previous PSI was completed). Thus, complete data covering the 26-month period are available for all those in the 26-month analysis sample.

We did estimate impacts, however, using alternative sample definitions to test the robustness of study findings (see Appendix D). For example, we estimated point-in-time impacts on 36-month outcomes using those who completed both the 24- and 36-month PIs (the mediated analysis sample), as well as those who completed all birthday-related interviews and assessments (the growth curve analysis sample). As another example, we estimated impacts on service use and self-sufficiency outcomes using those who completed both the 15- and 26-month PSIs. Our results using alternative samples were very similar, so, in the main body of this report, we present only results that were obtained using the primary analysis samples described above.

C. ANALYTIC APPROACHES

The Early Head Start impact analysis addresses the effectiveness of Early Head Start services on key child, parenting, and family outcomes from several perspectives. The global analysis examines the overall impacts of Early Head Start across all 17 sites combined, while the targeted analysis addresses the important policy questions of what works and for whom.

1. Global Analysis

In this section, we discuss our approach for answering the question: Do Early Head Start programs have an effect on child, parenting, and family outcomes overall? Stated another way, we discuss our approach for examining the extent to which the 17 programs, on average, changed the outcomes of program participants relative to what their outcomes would have been had they not received Early Head Start services. First, we discuss our primary approach for estimating impacts per eligible applicant. Second, we discuss our approach for estimating impacts per participant (that is, for families that received Early Head Start services). Finally, we discuss our approach for estimating impacts using growth curve models.

a. Estimating Point-in-Time Impacts per Eligible Applicant

Random assignment was performed at the point that applicant families were determined to be eligible for the program. Thus, we obtained estimates of impacts per eligible applicant by computing differences in the average outcomes of all program and control group families at each time point. This approach yields unbiased estimates of program impacts on the *offer* of Early Head Start services, because the random assignment design ensures that no systematic differences between program and control group members existed at the point of random assignment except for the opportunity to receive Early Head Start services.

We used regression procedures to estimate program impacts, for two reasons. First, the regression procedures produce more precise impact estimates. Second, they can adjust for any differences in the observable characteristics of program and control group members due to random sampling and interview nonresponse. However, we also estimated impacts using simple differences-in-means procedures to test the sensitivity of our findings to alternative estimation strategies (see Appendix D). The two procedures yielded very similar results; we present the regression-adjusted estimates in the main body of this report.

We estimated variants of the following regression model:

$$(1)\quad y = \sum_{j=1}^{17} \alpha_j (S_j * T) + X\beta + \varepsilon,$$

where y is an outcome variable at a specific time point, S_j is an indicator variable equal to 1 if the family is in site j, T is an indicator variable equal to 1 if the family is in the program group, Xs are explanatory variables measured at baseline (that include site indicator variables), ε is a mean zero disturbance term, and α_j and β are parameters to be estimated. In this formulation, the estimate of α_j represents the regression-adjusted impact estimate for site j.[9]

An important aspect of our analytic approach was to give each site equal weight regardless of sample sizes within the sites. Early Head Start services are administered at the site level and differ substantially across programs; thus, the site is the relevant unit of analysis. Accordingly, the global impact estimates were obtained by taking the simple average of the regression-adjusted impact estimates in each site.[10] The associated t-tests were used to test the statistical significance of the impact estimates.

We included a large number of explanatory variables in the regression models (Table II.6 lists the categories of variables, and Appendix Table E.II.B provides variable descriptions and means). These variables were constructed using HSFIS data and pertain to characteristics and experiences of families and children prior to random assignment. We used two main criteria to select the explanatory variables: (1) they should have some predictive power in the regression models for key outcome variables (to increase the precision of the impact estimates); and (2) they should be predictors of interview nonresponse (to adjust for differences in the

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[9] The estimated standard errors of the impact estimates take into account the variance of outcomes within sites, but not the variance of impacts across sites. Thus, from a statistical standpoint, the impact estimates can be generalized to the 17 research sites only (that is, are internally valid), but not more broadly (that is, are not externally valid).

[10] Appendix D presents impact estimates where sites are weighted by their sample sizes. These results are very similar to those presented in the main body of this report.

TABLE II.6

CATEGORIES OF EXPLANATORY VARIABLES FOR REGRESSIONS

Family and Parent Characteristics

Age of Mother
Race
English-Language Ability
Education Level
Primary Occupation
Living Arrangements
Number of Children in the Household
Poverty Level
Welfare Receipt (AFDC/TANF; Food Stamps; WIC; SSI)
Has Inadequate Resources (Food, Housing, Money, Medical care, Transportation)
Previously Enrolled in Head Start or Another Child Development Program
Mobility in the Previous Year
Random Assignment Date

Child Characteristics

Age of Focus Child at Random Assignment
Age of Focus Child at Interview or Assessment
Birthweight Less than 2,500 Grams
Gestational Age
Gender
Evaluation History
Risk Categories (Established, Biological/Medical, Environmental)

SOURCE: HSFIS application and enrollment forms.

characteristics of program and control group respondents).[11] There was no theoretical reason to include different explanatory variables by site or to assume that the parameter estimates on the explanatory variables would differ by site. Thus, we used the same model specification for each site.[12] The regression R^2 values for key 36-month outcomes ranged from about .10 (for maternal depression and distress measures) to .15 (for parent-child interaction scales from the video assessments) to .30 (for measures of child cognitive and language development and the home environment) to .50 (for measures of welfare receipt).

As discussed, we constructed weights to adjust for interview nonresponse. Our basic approach was *not* to use these weights in the regression models, because there is no theoretical reason to use them in this context (DuMouchel and Duncan 1983). However, to test the robustness of study findings, we estimated some regression models using the weights (see Appendix D). We also used weights to obtain all estimates of impacts using simple differences-in-means procedures. The weighted and unweighted impact results are very similar (see Appendix D).

b. Estimating Point-in-Time Impacts per Participant

Random assignment occurred at the point of eligibility and not when families started receiving services. Hence, program and control group differences yield *combined* impact estimates for those who participated in Early Head Start and those who enrolled but did not participate.

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[11] We imputed missing values for the explanatory variables. If an explanatory variable was missing for 5 percent of cases or less, then missing cases were assigned the mean of the explanatory variable for nonmissing cases by site, research status, and race. If an explanatory variable was missing for more than 5 percent of cases, then we set the variable equal to zero for the missing cases and included as an explanatory variable an indicator variable that was set to 1 for missing cases and to zero otherwise.

[12] Several explanatory variables, however, did not pertain to some sites (Appendix Table E.II.B). For example, only 12 programs served families whose English was "poor," so the control variable for this measure varied only for families in those 12 programs.

An important evaluation goal, however, is to estimate impacts on those who received program services. Estimating impacts for this group is complicated by the fact that a straightforward comparison of the outcomes of program group participants and *all* control group members does not yield the desired impact on participants. Ideally, we would compare the outcomes of program group participants with control group families who would have participated in Early Head Start had they been in the program group. However, we cannot identify these control group families.

As discussed in Appendix D, we can overcome these complications by assuming that Early Head Start had no effect on families who enrolled but did not receive Early Head Start services. In this case, the impact per participant in a site can be obtained by dividing the impact per eligible applicant in that site by the site's program group participation rate (Bloom 1984). The estimated global impact per participant across all sites can then be calculated as the average of the estimated impacts per participant in each site.

A crucial issue is how to define a program participant. The key assumption that allows us to estimate impacts for participants is that the outcomes of those in the program group who enrolled but did not receive services would have been the same if they had instead been assigned to the control group (that is, the program had no effect on nonparticipants). Thus, in order to be confident that this (untestable) assumption holds, we need a conservative definition of a program participant.

A program group family was considered to be an Early Head Start participant if, during the 26 months after random assignment, the family received more than one home visit, met with a case manager more than once, enrolled its child in center care for at least two weeks, *or* participated in a group activity. This participation rate was 91 percent for the full program group. It ranged from 68 percent to 97 percent across the program sites, but was at least 88 percent in 15 of the 17 sites. Because the participation rate was fairly high in most sites, the estimated impacts per eligible applicant and the estimated impacts per participant are very similar.[13]

c. Crossovers in the Control Group and Spillover Effects

As discussed, about 0.7 percent of control group members participated in Early Head Start. These "crossovers" were treated as control group members in the analysis, to preserve the integrity of the random assignment design. Thus, the presence of these crossovers could yield impact estimates that are biased slightly downward if the crossovers benefited from program participation.

The procedure to estimate impacts for participants can be adapted to accommodate the control group crossovers (Angrist et al. 1996). This involves dividing the impacts per eligible applicant by the *difference* between the program group participation rate and the control group crossover rate. The key assumption underlying this procedure is that the outcomes of control group crossovers would have been the same if they had instead been assigned to the program group. These estimates, however, are very similar to the impacts per participant, because of the small number of crossovers. For example, the impacts per participant in most sites were obtained by dividing the impacts per eligible applicant by about .91, whereas the impacts that adjust for the crossovers were typically obtained by dividing the impacts per eligible applicant by .903 (.91 – .07). Thus, for simplicity, we do not present the impacts that adjust for crossovers.

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[13] The impact estimates per participant are slightly less precise than the impact estimates per eligible applicant, because the standard errors of the impact estimates per participant must take into account the estimation error of the participation rate in each site.

About one-third of control group families reported during the PSIs that they knew at least one family in Early Head Start. Thus, "spillover" effects could lead to impact estimates that are biased downwards if control group families, through their interactions with Early Head Start families, learned some of the parenting skills that program group families acquired in Early Head Start. It is difficult to ascertain the extent of these spillover effects, because we did not collect detailed information on the extent to which control group families benefited from their interactions with program group families. Furthermore, we cannot use the same statistical procedures to adjust for spillover effects as for crossover effects, because it is not reasonable to assume that the outcomes of control group families who had contact with program group families would have been the same had these controls instead been assigned to the program group (and directly received Early Head Start services). Thus, we do not adjust for spillover effects, and our impact estimates are likely to be conservative.

d. Growth Curve Models

We also used longitudinal statistical methods (or, more specifically, growth curve or hierarchical linear modeling) to estimate the effects of Early Head Start participation on child and family outcomes that were measured when the focus children were 14, 24, and 36 months old. These methods were used to examine impacts (program and control group differences) on the growth trajectories of child and family outcomes during the follow-up period.

In our context, the growth curve models can be estimated using the following two steps:

1. ***Fit a regression line through the three data points for each program and control group member, and save the estimated intercepts and slopes of the fitted lines.*** Mathematically, the following equation is estimated for *each* sample member:

   (2) $y_{it} = \alpha_{0i} + \alpha_{1i}(age_{it} - 15) + u_{it}$,

where y_{it} is the outcome variable of sample member i at time t, age_{it} is the age of the child (in months) at the interview or assessment, u_{it} is a mean zero disturbance term, and α_{0i} and α_{1i} are parameters to be estimated.[14] We use 15 months as the base period, because this was the average age of the children at the 14-month interviews and assessments.

2. ***Compute impacts on the intercepts and slopes from Step 1.*** Mathematically, variants of the following equations are estimated:

$$(3)\ \alpha_{0i} = \beta_0 + \beta_1 T_i + X_i\delta + \varepsilon_{0i}$$
$$(4)\ \alpha_{1i} = \gamma_0 + \gamma_1 T_i + X_i\theta + \varepsilon_{1i},$$

where α_0 is the vector of intercepts from equation (2) (and which are replaced by their estimates), α_1 is the vector of slopes from equation (2) (and which are replaced by their estimates), T is an indicator variable equal to 1 if the family is in the program group, Xs are explanatory variables, ε_0 and ε_1 are mean zero disturbance terms (that are assumed correlated with each other and with the error term in equation (2) for the same individual but not across individuals), and the βs, γs, δs, and θs are parameters to be estimated.

In this formulation, the estimate of the slope, γ_1, represents the program and control group difference in the mean growth of the outcome variable between the 14- and 36-month data collection points. The estimate of the intercept, γ_0, represents the point-in-time impact of Early Head Start on the outcome variable at 15 months (the base period).[15,16]

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[14] With only three data points, it is necessary to posit a *linear* relationship between the outcome measure and the child's age. With additional follow-up data, it would be possible to include quadratic age terms as additional explanatory variables in the model.

[15] To increase the precision of the estimates, the growth curve models were estimated in *one* stage rather than two by inserting equations (3) and (4) into equation (2) and by setting the θs to zero. Generalized least squares techniques were used to estimate this regression model where the explanatory variables included a treatment status indicator variable, a variable signifying the age of the child at the interview or assessment relative to 15 months, a term formed by interacting child's age relative to 15 months and the treatment status indicator variable, and the *X* variables.

[16] The estimates from the growth curve model represent impacts per eligible applicant. We did not estimate impacts for participants using this approach because of the analytic complications of obtaining these impacts and their correct standard errors.

For each outcome measure, the growth curve approach produces an overall regression line for the program group (defined by the mean estimated intercept and mean estimated slope across all program group members) and, similarly, an overall regression line for the control group. The *difference* between these overall regression lines at any given time point yields a point-in-time impact estimate.

The growth curve approach has several advantages over our basic point-in-time analysis. First, the growth curve approach may yield more precise impact estimates because it assumes that outcomes grow linearly over time. This functional form assumption "smoothes" the data points, which can lead to estimates with smaller standard errors. Second, because of the linearity assumption, the growth curve approach can account directly for differences in the ages of children at a particular interview or assessment (which occurred because it took more time to locate some families than others). Finally, the approach produces important descriptive summary information about the growth in outcomes over time, and can be used to predict future impacts.

There are, however, several important disadvantages of the growth curve approach. The main disadvantage is that the relationship between some outcomes and a child's age may not be linear. In this case, the growth curve approach can lead to biased impact estimates. A related issue is that the linearity assumption implies that the estimated *impacts* can only grow or diminish over time; they cannot grow and then diminish, or vice versa. As discussed in this report, this assumption is often violated. Another disadvantage of the growth curve approach is that it can be used only on those outcomes that were measured at all three time points (Chapter V discusses the specific outcome measures that were used in the growth curve analysis).[17] Finally, the sample for the growth curve approach includes only those sample members who completed interviews and assessments at *every* time point, whereas the point-in-time analysis uses all available data at each time point.[18]

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[17] In particular, we select outcome measures that are continuous variables (not binary or categorical variables) and that are not age-normed.

Importantly, despite these advantages and disadvantages, impacts obtained using the growth curve approach and our point-in-time approach *are very similar*. This is not surprising, because the growth curve approach essentially fits a regression line through the mean outcomes of program group members at each time point and, similarly, for the control group. Thus, if the growth of an outcome measure is roughly linear over time, then the overall regression line for the program group that is produced by the growth curve approach should pass close to the observed mean outcome for the program group at *each* time point, and, similarly, for the control group. Consequently, we view the growth curve approach as a supplementary analysis to our basic point-in-time analysis, and use it primarily to test the robustness of study findings. Results from the growth curve models are presented in Appendix D.5 and are discussed in Chapter V as we present our main findings.

e. Presentation of Results

In Chapters V through VII, where we report program effects on child, parenting, and family outcomes, and the effects on these outcomes for population subgroups, we present impact results for *participants*.[19] However, in Chapter IV, where we report program effects for the service use outcomes, we present results for *eligible applicants*, in order to understand the extent to which Early Head Start programs are serving eligible families, and to understand the services available to eligible families in the absence of Early Head Start. This analysis is critical to understanding program operations and implementation, as well as program impacts.

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[18] We also estimated growth curve models using sample members that had available data for at least *two* data points by specifying a simplified (random effects) error structure in equations (2) to (4). These results are very similar to those using the sample that have three data points, and are not presented in this report. We did not use statistical procedures to impute missing outcome data for our analysis, because response rates were similar for program and control group members. Thus, we are confident that our impact estimates are unbiased. Furthermore, we were concerned that imputing a large amount of outcome data could generate biased estimates.

[19] For completeness, we also present impacts on *eligible* applicants for selected child, parenting, and family impacts in Appendix D. These show essentially the same patterns of

In the impact tables in Chapters V to VII, we present the following statistics:

1. ***The Mean Outcome for Participants in the Program Group.*** This mean was calculated using the 91 percent of program group members who participated in Early Head Start (using the definition of participation discussed above).
2. ***The Mean Outcome for Control Group Members Who Would Have Been Early Head Start Participants if They Had Instead Been Assigned to the Program Group.*** This mean is not observed, but is estimated as the difference between the program group participant mean and the estimated impact per participant. We sacrifice technical accuracy for simplicity in the text, and refer to this mean as the "control group mean."
3. ***The Estimated Impact per Participant.*** As discussed, this impact was obtained by (1) dividing the regression-adjusted impacts per eligible applicant in each site by the program group participation rate in each site; and (2) averaging these site-specific impacts across sites.
4. ***The Size of the Impact in Effect Size Units.*** This statistic was calculated as the impact per participant divided by the standard deviation of the outcome variable for the control group times 100.
5. ***The Significance Level of the Estimated Impact.*** We indicate whether the estimated impact is statistically significant at the 1 percent, 5 percent, or 10 percent level, using a two-tailed test.[20] We indicate marginally significant findings at the 10 percent level, because we seek to identify patterns of program effects across the large number of outcomes and subgroups under investigation, and thus, relax the traditional 5 percent significance level threshold (see Section 3 below).

(continued)
impacts as the analysis of impacts for participants that we present in the main body of this report. In addition, as discussed, we only present impacts on eligible applicants for the growth curve analysis.

[20] We used a two-tailed test because it was not reasonable to assume *a priori* that Early Head Start would have only beneficial impacts on all outcomes, given that control group families could obtain other services in the community. The convention used throughout the Early Head Start evaluation reports is that * indicates p<.10, ** indicates p<.05, and *** indicates p<.01.

We present similar statistics in Chapter IV for the impact findings on service use outcomes, except that the statistics pertain to eligible applicants rather than to participants only.

2. Targeted Analysis

The targeted analysis uses a more refined approach than the global analysis to examine the effects of Early Head Start on key outcomes. The targeted analysis addresses the important policy questions of what works, and for whom. It focuses on estimating whether impacts differ (1) for sites with different program approaches, implementation levels, and community contexts; (2) for families with different characteristics at the time of program application; and (3) for families who received different amounts of Early Head Start services. The analysis also examines the extent to which impacts on shorter-term (24-month) mediating variables correlate with impacts on longer-term (36-month) outcomes.

Specifically, the targeted analysis addresses the following research questions:

1. Do different program approaches have different program impacts?
2. Do different levels of program implementation result in different impacts?
3. Do different community contexts result in different impacts?
4. Do program impacts differ for children and parents with different baseline characteristics?
5. Are impacts on mediating variables consistent with impacts on longer-term outcomes?

a. Program Approach, Implementation Level, and Community Context

Early Head Start programs tailor their program services to meet the needs of eligible low-income families in their communities, and select among program options specified in the Head Start Program Performance Standards. ACYF selected the 17 research sites to reflect Early Head Start sites more broadly; thus the Early Head Start programs participating in the evaluation varied in their approach to serving families. Furthermore, they differed in their pattern of progress in implementing key elements of the revised Head Start Program Performance Standards. Accordingly, we examined how impacts varied by program approach, implementation level, and community context.

Impact results by program approach can provide important information on how to improve program services, as well as to develop and expand the program. Variations in impacts across programs that achieved different levels of implementation may provide insights into the importance of fully implementing key program services. Because Early Head Start programs are required to tailor services to meet local community needs, it is very important to understand the conditions under which they can have various effects.

The specific subgroups defined by key site characteristics that we examined are displayed in Table II.7. The table also displays the number of sites and the percentage of research families (at the time of random assignment) who are included in each subgroup. Table II.8 displays these variables by site (so that the overlap in these site subgroups can be examined). We selected these groupings in consultation with ACYF and the Early Head Start Research Consortium. Because of the small number of sites included in the evaluation, we limited the analysis to a few key subgroups that would capture distinguishing features of Early Head Start programs that are policy relevant and could be accurately measured.

For the analysis of impacts by program approach, we divided programs into four center-based, seven home-based, and six mixed-approach programs on the basis of their program approaches in 1997 (see Chapter I). As discussed throughout this report, because the three approaches offer different configurations of services, we expect differences in the pattern of impacts by approach (see, especially, discussions of the hypotheses relating to expected impacts in Chapter VI).

TABLE II.7

SUBGROUPS DEFINED BY PROGRAM APPROACH, IMPLEMENTATION PATTERN, AND COMMUNITY CONTEXT

Subgroup	Number of Sites	Percentage of Families
Program Approach		
Center-based	4	20
Home-based	7	46
Mixed Approach	6	34
Overall Implementation Pattern		
Early implementers	6	35
Later implementers	6	35
Incomplete implementers	5	30
Overall Implementation Among Home-Based Programs		
Early or later implementers	4	55
Incomplete implementers	3	45
Overall Implementation Among Mixed-Approach Programs		
Early implementers	3	54
Later or incomplete implementers	3	46
Implementation of Child and Family Development Services		
Full implementers in both areas in both time periods	4	24
Not full implementers in both areas in both time periods	13	76
Whether Program is in a Rural or Urban Area		
Rural	7	41
Urban	10	59
Whether State or County Has Work Requirements for TANF Mothers with Children Younger Than 1		
State has requirements	7	42
State has no requirements	10	58

SOURCE: Data from 1997 and 1999 site visits.

TABLE II.8

SUBGROUPS DEFINED BY SITE CHARACTERISTICS, BY SITE

		Implementation Pattern			
Site	Program Approach	Overall[a]	Strong Full Implementation[b]	Work Requirements for TANF Mothers With Infants	In an Urban Area
1	Center	Early	Yes	Yes	No
2	Home	Later	No	No	Yes
3	Mixed	Later	No	Yes	Yes
4	Center	Early	No	Yes	Yes
5	Mixed	Incomplete	No	No	Yes
6	Home	Incomplete	No	Yes	No
7	Mixed	Early	Yes	No	Yes
8	Home	Later	No	Yes	Yes
9	Home	Incomplete	No	No	Yes
10	Center	Incomplete	No	No	Yes
11	Home	Incomplete	No	No	Yes
12	Mixed	Later	No	No	No
13	Home	Early	Yes	No	No
14	Mixed	Early	Yes	Yes	No
15	Mixed	Early	No	No	Yes
16	Home	Later	No	No	No
17	Center	Later	No	Yes	No

SOURCE: Implementation study data.

NOTE: Sites are in random order.

[a] "Early" indicates program was rated as fully implementing the key elements of the Head Start Program Performance Standards in 1997, "later" means the program was fully implemented in 1999 but not 1997, and "incomplete" means full implementation was not achieved by 1999 (see Appendix C for more details of the implementation ratings).

[b] "Strong full implementation" indicates that a program fully implemented both child and family development services early and sustained full implementation of both areas in 1999.

We used data collected from the implementation study site visits in fall 1997 and fall 1999 to assess the degree of implementation in each of the research programs (see Chapter I). We then divided programs into (1) early implementers (six sites), (2) later implementers (six sites), and (3) incomplete implementers (five sites). The early implementers became "fully implemented" by 1997 and remained so at the time of the 1999 site visits, while the later implementers were not fully implemented in 1997 but were by 1999. The incomplete implementers had still not achieved full implementation by 1999, although they demonstrated a number of strengths in particular programmatic areas.[21] We also identified programs that achieved an especially strong pattern of full implementation—these were the four programs that fully implemented both child and family development services early and remained fully implemented in these areas in 1999.

To be rated as fully implemented overall, programs had to be fully implemented in most of the five component areas. Reflecting the Head Start Bureau's focus on child development, special consideration was given to the child development rating, and it was weighted more heavily in arriving at the consensus rating for overall implementation. The rating panel judged that three programs that were not rated "fully implemented" in child development should be rated as "fully implemented" overall because they were strong in all other component areas, were exceptionally strong in several aspects of child development services, and close to full implementation in the remaining areas.

Clearly, we expect impacts on child, parenting, and family outcomes to be larger in the fully implemented programs than in the incompletely implemented programs, because the fully implemented programs delivered services that were more intensive, more comprehensive, and of higher quality. Similarly, we expect impacts on child, parenting, and family outcomes to be even larger in the strong fully implemented programs. We also expect impacts to be larger in the programs that became fully implemented earlier than in those implemented later.

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[21] The assessment of levels of implementation is directly linked to the revised Head Start Program Performance Standards, and involved a systematic and rigorous process that is described fully in Chapter II of *Leading the Way,* Volume III (Administration on Children, Youth and Families 2000) and summarized in Appendix C of this report.

Assessing impacts by the level of implementation is complicated by the fact that the fully implemented programs were not evenly distributed across the program approaches, as can be seen in Table II.8. For example, only one of the seven home-based programs was an early implementer, as compared to two of the four center-based programs and three of the six mixed-approach programs. Thus, comparing all implementers to all nonimplementers confounds impact differences by implementation level with impact differences by program approach. Therefore, we also estimated impacts for subgroups defined by interacting program approach and implementation level. Because of sample size constraints, this analysis focused on comparing estimated impacts for the three *mixed* programs that were early implementers to those of the three *mixed* programs that were not early implementers and for the four home based programs that were implemented (whether early or later) compared to the three that were not implemented. (see Chapter VI and Appendix E.VI). There were too few center-based programs to make this comparison across implementation patterns.

We created two additional site-level subgroups: one defined by whether or not the state or county had work requirements for mothers who were receiving TANF and who had children younger than 12 months, and one defined by whether the program was located in an urban area. Hypotheses of expected impacts for these groups are discussed in Chapter VII.

The ability of the national evaluation to assess the community context was somewhat limited. A number of the local research teams conducted in-depth research in their program communities, however. Examples of their research are included in boxes in appropriate places in the report.

Estimation Issues. The random assignment design allows us to estimate unbiased impacts for sites with a specific characteristic by comparing the outcomes of program and control group members in those sites. For example, we obtained unbiased impacts for sites with center-based programs by estimating the regression models discussed above, using program and control group members in those four locations. Similarly, we estimated impacts for early implementers using only program and control group families in those six sites. Sites were given equal weight in all analyses. We conducted statistical tests to gauge the statistical significance of the subgroup impacts as well as whether the impacts differed across subgroups (for example, whether impacts for center-based, home-based, and mixed-approach sites differed).

Interpretation of Estimates. The results from this analysis should be interpreted cautiously, for several interrelated reasons. First, there are only a small number of programs in each subgroup, so the estimates are imprecise. Second, program features were not randomly assigned to the research sites. Instead, as specified in the Head Start Program Performance Standards, the programs designed their services on the basis of their community needs and contexts. Accordingly, the configuration of services offered, the program structure, and the characteristics of families served all varied across sites. Consequently, our results tell us about the effectiveness of specific program features *for programs that adopted those features, given their community contexts and eligible population.* The results do *not* tell us how successful a particular program feature would have been if it had been implemented in another site, or how well a family in one type of program would have fared in another. We are comparing the outcomes of program and control group families *within* sites, not comparing families across sites. Thus, for example, our results inform us about the effectiveness of mixed-approach programs for the research sites that implemented this program approach. These results, however, cannot necessarily be used to assess how the mixed approach would have succeeded in sites that chose to adopt home-based or center-based approaches, because of other differences in the characteristics of these sites.

These important qualifications can be further illustrated by noting that the characteristics of families differed by program approach (Table II.9). For example, compared to families in home-based and mixed-approach programs, families in center-based programs were much more likely to have been employed or in school at the time of program application, and to have older children. They were also less likely to be receiving welfare. Furthermore, communitycharacteristics, as well as implementation levels, differed by program approach. Because of these important differences, our results do not provide strong evidence that one particular program approach is better than another. Instead, our analysis addresses the important policy question of whether programs that purposively select and provide a particular array of services to meet perceived needs can effectively improve various outcomes for program participants in their communities.

We did attempt to isolate the effects of particular program features from others using two related approaches, although these results must be interpreted cautiously. First, we estimated regression models where subgroup impacts on program and family characteristics were estimated *simultaneously*. These models were estimated by including as explanatory variables terms formed by interacting the treatment status indicator variable with several key subgroup indicator variables. This method examines the effects of a particular program feature (for example program approach), holding constant the effects of other site features with which it may be correlated (such as implementation level and the characteristics of families served by the program).

TABLE II.9

KEY FAMILY, PARENT, AND CHILD CHARACTERISTICS AT BASELINE, BY PROGRAM APPROACH

(Percentages)

Characteristic	Program Approach		
	Center-Based	Home-Based	Mixed
Mother a Teenager at Birth of Focus Child	41	36	42
Mother's Education			
Less than grade 12	45	49	48
Grade 12 or earned a GED	29	28	29
Greater than grade 12	26	23	23
Race and Ethnicity			
White non-Hispanic	30	41	37
Black non-Hispanic	37	28	42
Hispanic	27	27	17
Received Welfare	26	39	37
Primary Occupation			
Employed	34	22	19
In school or training program	28	18	23
Neither	39	60	58
Living Arrangements			
With spouse	19	29	24
With other adults	43	30	48
Alone	38	41	28
Maternal Risk Index[a]			
0 or 1 (low risk)	21	17	18
2 or 3 (moderate risk)	57	56	54
4 or 5 (high risk)	23	27	29
Age of Focus Child			
Unborn	12	26	33
Less than 5 months	32	36	37
5 months or older	56	39	30

SOURCE: HSFIS application and enrollment forms.

[a] This index was constructed by summing the number of the following risk factors that the mother faced: (1) being a teenage mother; (2) having no high school credential; (3) receiving public assistance; (4) not being employed or in school or training, and (5) being a single mother.

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Second, as discussed, we estimated program impacts for finer subgroups of sites by combining across the site categories discussed above (see Appendix D). For example, we estimated impacts by combining the implementation and program approach categories. While these results were sometimes unstable because of small sample sizes, they provided important information about the pattern of program impacts across the important subgroups defined by site characteristics.

The results from these two analyses are very similar to the results where the site subgroups were estimated separately. For example, our results indicate that certain program approaches were not responsible for the results by implementation status, and that the results by program approach were not driven by the particular levels of implementation in the program approach subgroups. These analyses, however, could only control for a small number of site features, because of the relatively small number of sites in the sample. Consequently, it is likely that our models do not adequately control for other important differences across sites that could affect impacts. Thus, as discussed, the subgroup results must be interpreted cautiously.

b. Child and Family Characteristics

Determining the extent to which Early Head Start programs benefit children and families with different personal characteristics has important policy implications, both for the operation of Early Head Start and for the development of other programs designed to serve this population. Policymakers and program staff can use findings from this subgroup analysis to improve program services and target them appropriately. Even where equity considerations prevent targeting of services, subgroup impacts could provide insights into how the program generates large or small overall impacts.

We constructed the child and family subgroups for the analysis using HSFIS data. The variables were measured at baseline (that is, *prior* to random assignment), because variables pertaining to the post-random assignment period are outcomes (that is, they could have been affected by Early Head Start participation) and therefore cannot be used to define valid subgroups. We selected the subgroups in consultation with ACYF and the Early Head Start Research Consortium to capture key variations in the program needs and experiences of families served by Early Head Start.

We examined the following subgroups (Table II.10 displays subgroup sample sizes):

- ***Mother's Age at Birth of Focus Child.*** It is likely that a number of developmental outcomes vary by the mother's age, and the difficulty of supporting mothers in various aspects of parenting might also vary by the mother's age. About 39 percent of mothers were teenagers when the Early Head Start focus child was born (including those born after random assignment). We created a group consisting of mothers under 20 years of age in order to have a subgroup of teenagers sufficiently large for analysis.

- ***Mother's Education.*** Considerable research has shown the mother's education to be a predictor of children's development and well-being. We created three subgroups (completion of less than 12th grade, completion of grade 12 or attainment of a GED, and education beyond high school). About half the mothers had not completed high school by the time they applied to Early Head Start, and about one-fourth were in each of the other groups.

- ***Race and Ethnicity.*** A little more than one-third of the program applicants were white non-Hispanic, about one-third were African American non-Hispanic, and one-quarter were Hispanic. (The "other" group is too small to constitute a subgroup.)

- ***Whether Mother Received AFDC/TANF Cash Assistance.*** As noted in Chapter I, Early Head Start began just as TANF was enacted. Issues related to public assistance and employment are of keen interest to policymakers, so it was important to examine the extent to which Early Head Start programs benefited families receiving such assistance (about 35 percent of mothers were receiving AFDC/TANF at the time they applied to their local Early Head Start program).

- ***Primary Occupation.*** Three subgroups were used to distinguish applicants who were employed, in school or training, or neither. About 50 percent were neither working nor in school, with about 25 percent employed and 25 percent in school.

TABLE II.10

SUBGROUPS DEFINED BY FAMILY AND CHILD CHARACTERISTICS AT BASELINE

	Sample in All Sites		Sample in Sites With at Least 10 Program Group Participants and 10 Controls in the Subgroup[a]		
Subgroup	Sample Size	Percent of Families	Sample Size	Number of Sites	Number of Sites in 36-Month Bayley Sample
Parent and Family Characteristics					
Mother's Age at Birth of Focus Child					
Less than 20	1,142	39	1,116	16	14
20 or older	1,771	61	1,754	16	16
Missing	88				
Mother's Age at Birth of First Child					
Less than 19	1,247	42	1,247	17	14
19 or older	1,720	58	1,691	16	16
Missing	34				
Mother's Education					
Less than grade 12	1,375	48	1,375	17	15
Grade 12 or attained a GED	822	29	773	14	9
Greater than grade 12	682	24	664	15	8
Missing	122				
Race and Ethnicity[b]					
White Non-Hispanic	1,091	37	1,017	11	7
Black Non-Hispanic	1,014	35	952	10	9
Hispanic	693	24	643	8	4
Missing	68				
Welfare Receipt[c]					
Received welfare	842	35	769	13	7
Did not receive welfare	1,554	65	1,554	17	16
Missing	41				
Primary Occupation					
Employed	677	24	651	15	8
In school or training	630	22	564	12	6
Neither	1,590	55	1,590	17	16
Missing	104				
Primary Language					
English	2,265	79	2,265	17	16
Other	615	21	560	9	4
Missing	121				
Living Arrangements					
With spouse	752	25	657	11	8
With other adults	1,157	39	1,157	17	14
Alone	1,080	36	1,021	14	13
Missing	12				
Presence of Adult Male in the Household					
Male present	1,153	39	1,145	16	15
Male not present	1,836	61	1,836	17	17
Missing	12				

TABLE II.10 *(continued)*

	Sample in All Sites		Sample in Sites With at Least 10 Program Group Participants and 10 Controls in the Subgroup[a]		
Subgroup	Sample Size	Percent of Families	Sample Size	Number of Sites	Number of Sites in 36-Month Bayley Sample
Random Assignment Date					
Before 10/96	1,088	36	1,062	13	10
10/96 to 6/97	916	31	916	16	10
After 6/97	997	33	952	15	11
Missing	0				
Maternal Risk Index[d]					
0 or 1 (low risk)	483	18	336	8	4
2 or 3 (moderate risk)	1,478	55	1,478	17	16
4 or 5 (high risk)	713	27	665	13	6
Missing	327				
Mother at Risk for Depression[e]					
Yes (CES-D at least 16)	617	48	617	8	7
No (CES-D less than 16)	658	52	658	8	8
Focus Child Characteristics					
Age					
Unborn	761	25	678	12	8
Less than 5 months	1,063	35	1,051	16	16
5 months or older	1,177	39	1,172	16	14
Missing	0				
Gender					
Male	1,510	51	1,510	17	17
Female	1,448	49	1,448	17	17
Missing	43				
First Born					
Yes	1,858	63	1,858	17	17
No	1,112	37	1,097	15	13
Missing	31				
Sample Size	**3,001**				

SOURCE: HSFIS application and enrollment data.

[a] Data for the subgroup analysis pertain to sites that have at least 10 program group participants and 10 control group members in the subgroup.

[b] About 5 percent of cases (135 cases) were American Indian, Eskimo, Aleut, and Asian or Pacific Islander. Sample sizes for these groups were too small to support separate impact estimates for them.

[c] Data pertain to families with focus children who were born at baseline.

[d] This index was constructed by summing the number of the following risk factors that the mother faced: (1) being a teenage mother; (2) having no high school credential; (3) receiving public assistance; (4) not being employed or in school or training, and (5) being a single mother.

[e] The CES-D was administered at baseline to sample members in eight sites only.

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- ***Living Arrangements.*** We created three categories: (1) lives with a spouse, (2) lives with other adults, and (3) lives alone. The sample is divided, with about 25, 39, and 36 percent in each of these groups, respectively.
- ***Age of the Focus Child.*** We created three subgroups based on the age of the child at random assignment: (1) unborn, (2) under 5 months, and (3) 5 to 12 months, with 25, 35, and 39 percent of the sample in each group, respectively.
- ***Gender of the Focus Child.*** About 50 percent of the sample children are boys and 50 percent girls.
- ***Birth Order of Focus Child.*** About 63 percent were first-born.
- ***Mother's Risk of Depression.*** Local researchers in eight sites administered the CES-D at baseline. For that subset of sites, we grouped families into those in which the primary caregiver was at risk for depression (CES-D at least 16) and those in which the primary caregiver was not at risk for depression. About 48 percent of primary caregivers were at risk according to this measure.

Because many of the family subgroups are correlated with each other, we constructed a maternal risk index to reduce the dimensionality of the subgroup analysis. We defined the index as the number of risk factors that the mother faced, including (1) being a teenage mother, (2) having no high school credential, (3) receiving public assistance, (4) not being employed or in school or training, and (5) being a single mother. We created three subgroups for the impact analysis: (1) those with 0 or 1 risk factor (low risk; 18 percent of mothers); (2) those with 2 or 3 factors (moderate risk; 55 percent of cases), and (3) those with 4 or 5 factors (high risk; 27 percent of cases). Because the high and low risk groups were relatively small, we also looked at two additional subgroups: families with 0 to 2 risk factors and families with 3 to 5 risk factors.

Estimation Issues. Random assignment simplifies estimating impacts for subgroups defined by child and family characteristics measured at the time of application to Early Head Start. Differences in the mean outcomes between program and control group members in a particular subgroup provide unbiased estimates of the impact of Early Head Start for the subgroup. For example, we estimated impacts for teenage mothers by comparing the mean outcomes of teenage mothers in the program and control groups. Similarly, we estimated impacts for female focus children by comparing the outcomes of girls in the program and control groups. We used similar regression procedures, as discussed above, to estimate impacts per eligible applicant and per participant only. We conducted statistical tests to gauge the statistical significance of the subgroup impact estimates, and the difference in impacts across levels of a subgroup.

Because our primary approach was to weight each site equally in the analysis, to avoid unstable results, we included sites in particular subgroup analyses only if their sample included at least 10 program group participants and 10 control group members in that subgroup. Most sites were included in each of the subgroup analyses, although this was not always the case (Table II.10). For example, for the full sample, only 8 sites had the requisite number of Hispanic families, only 11 had the requisite number of primary caregivers who lived with a spouse or partner, and only 12 had enough families with unborn focus children. Furthermore, fewer sites were included for outcomes constructed from data sources with lower response rates, such as the Bayley and video assessments. Thus, the subgroup results must be interpreted cautiously, because they are somewhat confounded with impacts by site.

We conducted several analyses to examine the sensitivity of the subgroup impact results to alternative estimation strategies. First, as described in the previous section, we estimated regression models where subgroup impacts on program and family characteristics were estimated *simultaneously*. The purpose of this analysis was to try to isolate the effects of a particular subgroup (for example, the mother's age), holding constant the effects of other family and site features with which it may be correlated (such as education level). Second, we estimated impacts using different weighting schemes. For example, we estimated subgroup impacts where members of a subgroup from all sites were pooled, so that sites with more subgroup members were given a larger weight in the analysis than sites with fewer subgroup members. In most cases, our conclusions about impacts on subgroups defined by family and child characteristics are similar using these alternative estimation strategies. The figures presented in this report are based on our primary estimation approach discussed above.

c. Presentation of Results for Child, Family, and Site Subgroups

The results from the targeted analysis are presented in a similar way as the results from the global analysis. We present subgroup impact results *per participant* for the child, parenting, and family outcomes. Focusing on the impacts per participant in the subgroup analyses is particularly important because of some subgroup differences in participation rates (see Chapter IV). For example, if participation rates were high in center-based programs and low in home-based programs (which is not the case), comparing impacts *per eligible applicant* would be misleading, because the impacts would be "diluted" more for the home-based programs. Thus, focusing on the impacts per participant facilitates the comparison of impacts across subgroups. As with the global analysis, however, we present impact results per *eligible applicant* for the service use outcomes. For all outcomes, we indicate not only whether impact estimates for each subgroup are statistically significant, but also whether the difference between impacts across levels of a subgroup are statistically significant.

We view the subgroup impact results by site characteristics as particularly important, and present these results in Chapter VI. We present the results for the subgroups based on family and child characteristics together in Chapter VII. The emphasis we place on various subgroups in our presentation varies, depending on the outcome variable and our hypotheses about the extent and nature of expected program impacts.

d. Impacts by Level of Service Intensity and Program Engagement

Families in the program group received different amounts of Early Head Start services. The amount and nature of services that a particular family received were determined in part by family members themselves (because Early Head Start is a voluntary program), as well as by the amount and nature of services they were offered. Thus, the level of services received by families differed both within and across programs.

An important policy issue is the extent to which impacts on key outcomes varied for families who received different levels of service intensity. Evidence that service intensity matters (that is, that impacts are larger for families who received more services than for those who received fewer services) would indicate a need to promote program retention, and might justify focusing future recruiting efforts on those groups of families who are likely to remain in the program for a significant period of time.

We took two approaches to assessing evidence that service intensity matters: (1) an *indirect* approach that relies on service use data for *groups* of families and programs and that draws on the experimental subgroup analysis, and (2) a *direct* approach that relies on service use data at the *individual* family level and employs statistical techniques to account for the fact that families were not randomly assigned to receive more or less intensive services.

For the *indirect* approach, we compared impacts on key child and family outcomes for subgroups of families likely to receive intensive services to impacts for subgroups that were less likely to receive intensive services. Our hypothesis is that, if impacts are generally larger for the subgroups of families who received intensive services, then these results are suggestive that service intensity matters. Of course, there are likely to be other factors that could explain impact differences across subgroups besides differences in the amount and types of services received. However, a consistent pattern of findings across subgroups is indicative of dosage effects. An advantage of this approach is that it uses the subgroup impact estimates—that are based on the experimental design—to indirectly assess dosage effects. In Chapter III, we discuss variations in service intensity across key subgroups, and in Chapter IV, we discuss the linkages between service intensity and impacts on child and family outcomes as we present our subgroup findings.

We also attempted to *directly* assess the extent to which service intensity matters by using service use data on individual families. This analysis is complicated by the fact that families were not randomly assigned to different levels of service intensity. Rather, the amount of services a family received was based on the family's own decisions, as well as on the services offered to the family in their site. Thus, estimating dosage effects is complicated by the potential presence of *unobservable* differences between those families who received different amounts of services that are correlated with child and family outcome measures and are difficult to account for in the analysis. If uncorrected, this "sample selection" problem can lead to seriously biased estimates of dosage effects.

For example, we generally find that less disadvantaged families were more likely to receive intensive services than more disadvantaged families. Thus, the simple comparison of the average outcomes of program group families who received intensive services with the average outcomes of program group families who received less intensive services are likely to yield estimates that are biased upward (that is, they are too large), because the outcomes of the high service-intensity group (better-off families) probably would have been more favorable regardless of the amount of services that they received. Multivariate regression analysis can be used to control for observable differences between the high and low service-intensity families. However, there are likely to be systematic unobservable differences between the two groups, which could lead to biased regression results.[22] A similar sample selection problem exists if we were to compare high service-intensity program group families to the full control group.

As discussed in detail in Appendix D.7, we used propensity scoring procedures (Rosenbaum and Rubin 1983) as our primary approach to account for selection bias. This procedure uses a flexible functional form to *match* control group members to program group members based on their observable characteristics. The procedure assumes that, if the distributions of observable characteristics are similar for program group members and their matched controls, then the distributions of unobservable characteristics for the two research groups should also be similar. Under this (untestable) assumption, we can obtain unbiased impacts estimates for those who received intensive services by comparing the average outcomes of program group members who received intensive services to the average outcomes of their matched controls. Similarly, impacts for those in the low-service intensity group can be obtained by comparing the average outcomes of program group families who did not receive intensive services with their matched controls. The two sets of impact estimates can then be compared.

In order to test the robustness of our findings using the propensity scoring approach, we also estimated dosage effects by (1) calculating, for each program group member, the difference between their 14- and 36-month outcomes (that is, the growth in their outcomes), and (2) comparing the mean difference in these growth rates for those in the low and high service-intensity groups. This "fixed-effects" or "difference-in-difference" approach adjusts for selection bias by assuming that permanent unobservable differences between families in the two service intensity groups are captured by their 14-month measures. This analysis was conducted using only those outcomes that were measured at multiple time points. The details and limitations of this approach are discussed in Appendix D.7.

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[22] In logit regression models where the probability a family received intensive services was regressed on baseline measures from HSFIS and on site-level indicator variables, the pseudo-R^2 values were only about .10. Thus, service receipt decisions can be explained only in small part by observable variables.

Results from the service intensity analysis using the propensity scoring and fixed effects approaches did not yield consistent, reliable results. Thus, we do not discuss these results in the main body of the report, but discuss them in Appendix D.7.

We estimated dosage effects using two overall measures of service intensity. First, we constructed a measure using data from the PSI and exit interviews. Families were categorized as receiving intensive services if they remained in the program for at least two years and received more than a threshold level of services. The threshold level for those in center-based sites was the receipt of at least 900 total hours of Early Head Start center care during the 26-month follow-up period. The threshold level for those in home-based sites was the receipt of home visits at least weekly in at least two of the three follow-up periods. Families categorized as receiving intensive services in mixed-approach sites were those who exceeded the threshold level for either center-based or home-based services. About one-third of program group families received intensive services using this definition.

Second, we used a measure of program engagement provided by the sites for each family in the program group. Program staff rated each family as (1) consistently highly involved throughout their enrollment, (2) involved at varying levels during their enrollment, (3) consistently involved at a low level throughout their enrollment, (4) not involved in the program at all, or (5) involvement unknown (they could not remember how involved the family was). Those 40 percent of families who were rated as consistently highly involved were considered to have received intensive services in our analysis.

There is some overlap between the two intensity measures, although there are many families who are classified as having receiving intensive services according to one measure but not the other. For example, about 58 percent of those classified as high dosage using the PSI measure were also classified as high dosage using the program engagement measure. Similarly, about half of those classified as high dosage using the program engagement measure were also classified as high dosage using the PSI measure.

The lack of perfect overlap between the two intensity measures reflects the different aspects of program involvement that they measure. The first measure is based on duration of enrollment and hours of center care or frequency of home visits, and reflects the quantity of services received, while the second measure captures staff assessments of families' level of involvement in program services in terms of both attendance and emotional engagement in program activities.

e. Mediated Analysis

The analyses described so far have not addressed the mechanisms whereby outcomes at one point in time (the mediators) might influence subsequent outcomes, or the extent to which impacts on mediating variables at an earlier age are consistent with impacts on later outcomes. We therefore conducted mediated analyses to examine how Early Head Start impacts on parenting outcomes when children were 2 years old are associated with impacts on children's age 3 outcomes.

In presenting the results, we describe hypotheses based on child development theory and program theory of change that suggest age 2 parenting variables that could be expected to contribute to 3-year-old child impacts. The results of the mediated analyses permit us to estimate the extent to which the relationships between the 3-year-old child impacts and the parenting outcomes when children were 2 are consistent with the hypotheses. They suggest explanations for the impacts that Early Head Start programs produced when the children were 3 years old.

Mediated analyses serve several additional purposes:

- They can be used to examine whether impact estimates for the evaluation are internally consistent (that is, they "make sense") based on the theoretical relationships between mediating and longer-term outcomes.
- Through these analyses, we provide plausible support for, or raise questions about, programs' theories of change that suggest the programs can have an impact on children through earlier impacts on parenting behavior.
- Program staff can use the results to focus efforts on improving mediating variables that Early Head Start has large impacts on and that are highly correlated with longer-term child outcomes. For example, if Early Head Start has a significant impact on the time that parents spend reading to their children, and if time spent reading is highly correlated with children's language development, then policymakers could use this information to increase program efforts to promote reading.

The specific mediated analyses that we conducted, and the results from these analyses, are discussed in Chapters V and VI and Appendix D.9. The discussion in the remainder of this section focuses on the statistical procedures.

The approach to the mediated analysis can be considered a three-stage process. In the first stage, a longer-term outcome measure was regressed on mediators and other explanatory variables (moderators). In the second stage, the regression coefficient on each mediator was multiplied by the impact on that mediator. These products are what we would expect the impacts on the longer-term outcome to be, based on the relationship between the mediators and the longer-term outcome. We label them "implied" impacts. Finally, the *implied* impacts were compared to the *actual* impact on the longer-term outcome. These results indicate the extent to which impacts on the longer-term outcome variable can be partitioned into impacts due to each mediator.

Formally, we conducted the mediated analysis by first estimating the following regression model:

$$(6)\quad y = \alpha_0 + \alpha_1 T + \sum_i M_i \gamma_i + X\beta + \varepsilon,$$

where y is a longer-term (36-month) outcome, T is an indicator variable equal to 1 for program group members, M_i is a mediating (24-month) variable, X are explanatory variables (moderators), ε is a mean zero disturbance term, and the other Greek letters are parameters to be estimated. The estimated parameters from this model were then used to partition the *impact* on y (denoted by I_y) as follows:

$$(7)\quad I_y = \hat{\alpha}_1 + \sum_i I_{M_i} \hat{\gamma}_i,$$

where I_{Mi} is the impact on the mediator.

In this formulation, the parameter, γ_i, represents the marginal effect of a particular mediator on the longer-term outcome variable, holding constant the effects of the other mediators and moderators. For example, it represents the change in the longer-term outcome variable if the value of the mediator were increased by one unit, all else equal.[23] Thus, the impact of Early Head Start on the longer-term outcome in equation (7) can be decomposed into two parts: (1) a part due to the mediators (the "implied" impacts), and (2) a part due to residual factors (represented by the parameter α_1). Our analysis focuses on the part due to the mediators and the extent to which these implied impacts account for the impact on the longer-term outcome.

As important as the mediated analyses are, we interpret them cautiously, for a number of reasons. Like correlation coefficients, they describe relationships without necessarily attributing causality. In addition, they do not allow us to test the structural model specifying the relationships between the two sets of measures. In general, interpretations of the results of mediated analyses are difficult because of the complex relationships between the parent and child measures, and the likely bias in these estimated relationships due to simultaneity (sample selection) problems. In other words, the estimated parameter on a particular parent outcome may be capturing the effects of other factors influencing the child outcome that are not controlled for in the regression models. We interpret the results cautiously for another reason: It is likely that the estimated relationships are biased upwards (that is, suggesting a strong relationship), because child outcomes tend to be better in families with better parent outcomes. With these considerations in mind, our goal is to examine the broad relationships between the mediators and longer-term outcomes to suggest explanations for the impacts that Early Head Start programs produced when the children were 3 years old.

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[23] For simplicity, we assume that the effect of the mediator on the longer-term outcome variable is the same for the program and control groups. This assumption can be relaxed by including in the model terms formed by interacting the mediators and the program status indicator variable.

3. Criteria for Identifying Program Effects

The global and targeted analyses generated impact estimates for a very large number of outcome measures and for many subgroups. In each analysis, we conducted formal statistical tests to determine whether program-control group differences exist for each outcome measure. However, an important challenge for the evaluation is to interpret the large number of impact estimates, to assess whether, to what extent, and in which areas Early Head Start programs make a difference.

The initial guide we use to determine whether programs have had an impact on a particular outcome variable at this interim stage was the p-value associated with the t-statistic or chi-square statistic for the null hypothesis of no program impact on that outcome variable. We adopt the convention of reporting as significant only those program-control differences that are statistically significant. So that we can examine patterns of effects, we include differences significant at $p<.05$ and $p<.01$, but we also note marginally significant findings, where $p<.10$, when they contribute to a consistent pattern of impacts across multiple outcomes.[24] However, criteria more stringent than the p-values are needed to identify "true" program impacts, because significant test statistics are likely to occur by chance (even when impacts may not exist) because of the large number of outcomes and subgroups under investigation. For example, when testing program-control group differences for statistical significance at the 5 percent level, 1 out of 20 independent tests will likely be significant when, in fact, no real difference exists.

Thus, we apply several additional criteria to identify potential program impacts:

1. We examine the magnitude of the significant impact estimates to determine whether the differences are large enough to be policy relevant. To provide a common benchmark that allows comparison across various findings that are based on different scales, we assess impacts in reference to effect size units. As noted earlier, the effect size is expressed as a percentage calculated by dividing the magnitude of the impact by the standard deviation of the outcome variable for the control group multiplied by 100.
2. We check that the sign and magnitude of the estimated impacts and effect sizes are similar for related outcome variables and subgroups.
3. We analyze subgroup impacts from the targeted analysis to examine whether impacts follow the pattern predicted (see below).
4. We determine whether the sign and magnitude of the impact estimates are robust to the alternative sample definitions, model specifications, and estimation techniques discussed in this chapter.
5. We drew on local research through discussion of findings with local researchers and include summaries of some of their research throughout the remaining chapters of this volume, and in Volume III.

In discussing subgroup findings, we compare impacts across subgroups and focus primarily on those differences in impacts that are statistically significant according to the chi-square statistic. The chi square is a conservative test, however, so we use it as a guide rather than an absolute rule. We also discuss impacts within particular subgroups that are statistically significant or relatively large (in terms of effect sizes), without comparison to their counterpart subgroups. Some of the demographic subgroups are small, and power to detect significant differences is low. In these subgroups, especially, we note relatively larger impacts even when they are not statistically significant, in order to identify patterns of findings. In drawing conclusions from the impact estimates, we focus on patterns of impacts across outcomes, rather than giving undue emphasis to isolated impacts.

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[24] The majority of significant impacts reported are significant at the .05 or .01 level, and in each set of related child or family outcomes for which we found any significant impacts, the pattern of significant impacts includes some (or all) impacts that are significant at the .01 or .05 level.

In sum, we identify program effects by examining the *pattern* of results rather than by focusing on isolated results. At this early stage in the evolution of Early Head Start programs, it is important to be able to see the range of potential impacts, while at the same time using rigorous criteria for interpreting meaning across the outcome areas and various subgroups that are of the greatest interest to the Head Start Bureau, other policymakers, and the hundreds of Early Head Start programs around the country.

III. PARTICIPATION IN EARLY HEAD START SERVICES

Early Head Start is a complex intervention program that is challenging to implement. As a first step toward understanding the intervention's impacts on children and families, we document program accomplishments and the services families received. Did the 17 research programs provide a fair test of the Early Head Start concept? Evidence from the implementation study shows that, overall, the research programs succeeded in implementing Early Head Start services and delivering core services to most families while they were enrolled in the program (Administration on Children, Youth and Families 2002).

To set the context for examining program impacts, this chapter describes in detail families' participation in program services and levels and intensity of service use during 28 months, on average, after families' enrollment in Early Head Start. The chapter also describes variations in program participation and the intensity of services received by families across program types and patterns of program implementation. The first section describes the data sources we used and the terms we use to discuss levels of service use and intensity during various time periods. The sections that follow describe families' levels of overall program participation and participation in specific child development and family services. The final section summarizes our conclusions about the levels and intensity of program participation. The next chapter contrasts the services that program families received with those received by control group families.

A. DATA SOURCES

We drew on the following data sources to analyze families' participation in program services:

- Head Start Family Information System application and enrollment forms completed at the time of enrollment.

- Parent services follow-up interviews targeted for 6, 15, and 26 months after program enrollment (and completed an average of 7, 16, and 28 months after enrollment). We included in our analyses families for whom data were available for all three of these follow-up periods (71 percent of program group members).
- Exit interviews conducted when children were approximately 3 years old and families became ineligible for Early Head Start.[1]
- Ratings of each family's engagement with the program provided by program staff in summer 2000, after most families had left the program.
- Data from the implementation study on Early Head Start programs' three main approaches to providing child development services—home-based, center-based, and mixed-approach (combination of home- and center-based).[2]
- Ratings of program implementation developed as part of the implementation study, in which programs were classified as early implementers (fully implemented in 1997 and 1999), later implementers (fully implemented in 1999 but not in 1997), or incomplete implementers (not fully implemented in 1997 or 1999).[3]

The length of the follow-up period and children's ages at the time of the interviews varied over a wide range for each wave of parent services interviews. The length of followup ranged from 4 to 15 months after enrollment for the first follow-up interview, 9 to 27 months for the second interview, and 24 to 59 months for the third interview.[4] Because the interviews were conducted according to the length of time since families enrolled, the ages of the children in the research sample at the time of the interview also varied. On average, focus children were 10 months old when the first follow-up interview was completed, 20 months old at the second interview, and 32 months old at the third interview.

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[1] The exit interview was conducted at the time of the 36-month child and family assessment. If the family had recently completed the final Parent Services Follow-Up Interview, then only the portion of the exit interview related to program experiences was conducted with program families in conjunction with the 36-month child assessment and parent interview. For this report, we used information on duration of program participation from the exit interview.

[2] Chapter I gives a more detailed description of the Early Head Start programs' approaches to providing child development services.

[3] Chapter I provides a more detailed description of these ratings, and *Pathways to Quality* (Administration on Children, Youth and Families 2002) includes an in-depth analysis of programs' implementation patterns.

[4] Nearly all interviews were completed by 38 months after enrollment.

In this and the next chapter, we report primarily on cumulative levels of service use across all three follow-up periods covered by the parent services follow-up interviews. We use the term "combined follow-up period" to refer to the entire period covered by these cumulative measures. We also report some measures of service receipt and intensity of services received in at least one or two of the three follow-up periods. Occasional deviations from the use of these terms are explained in the text. Unless otherwise noted, the measures are based on parent reports.

B. LEVELS OF OVERALL PARTICIPATION IN PROGRAM SERVICES

Almost all program group families participated in Early Head Start at least minimally during the combined follow-up period. Overall, 91 percent of program families received at least one Early Head Start home visit, participated in Early Head Start center-based child care, met with an Early Head Start case manager at least once, and/or participated in Early Head Start group activities (group parenting education, group parent-child activities, or parent support group). Moreover, nearly all these families (90 percent of program group members) participated beyond this minimum level, receiving more than one home visit or case management meeting, center-based child care, and/or group parenting activities.[5]

Although participation levels exceeded 90 percent in 15 of the 17 research programs, two center-based programs had lower participation rates (64 and 75 percent). Several factors contributed to these low rates. In one program, some families needed full-time child care before the program expanded to offer it. In the other, a very rapid initial recruiting process and a delay in opening one center may have led some program families to find child care elsewhere.

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[5] The initial home visit or case management meeting was often used to complete enrollment and not to provide services. Thus, it can be assumed that the outcomes for families who received only one or no home visits or case management meetings could not have been affected. We used this percentage to translate impacts on eligible applicants into impacts on program participants (see Chapter II for a more detailed explanation). By reporting the percentage of families who received at least this minimal level of services, we do not intend to imply that this level represents a programmatically meaningful amount of Early Head Start services.

C. DURATION OF PROGRAM PARTICIPATION

According to staff, program group families participated in Early Head Start for an average of 21 months, with nearly half of the families participating for at least two years (Table III.1). Families in the research sample could have enrolled in Early Head Start at any time after the mother became pregnant with the focus child until the child's first birthday. Thus, families' length of eligibility for program services varied, ranging from more than three years (if the family enrolled before the focus child's birth) to about two years (if the family enrolled when the focus child was nearly a year old). Therefore, families who participated in Early Head Start for less than 24 months (49 percent of program families) left the program before their eligibility ended.

Research families left the programs for a variety of reasons. When staff rated the families' engagement in summer 2000 (see section III.H. below, on program engagement ratings), they indicated the reasons families left the programs. Of the three quarters of families who had left the program by summer 2000, approximately one-third had graduated or transitioned out of the program when their eligibility ended. One-fourth had moved out of the service area before completing the program. Nearly one-third were terminated by staff because of poor attendance or lack of cooperation, or they asked to be removed from the program rolls. Home-based programs were much more likely to report that they terminated families' enrollment for poor attendance or lack of cooperation, while center-based and mixed-approach programs were more likely to report that families had asked to be removed from program rolls.

TABLE III.1

DURATION OF EARLY HEAD START PARTICIPATION BY PROGRAM FAMILIES, FOR THE FULL SAMPLE AND KEY PROGRAM SUBGROUPS

		Program Approach			Pattern of Implementation		
	Full Sample	Center-Based	Home-Based	Mixed-Approach	Early Implementers	Later Implementers	Incomplete Implementers
Percentage of Families Who Were Enrolled in Early Head Start[a]:							
Less than 1 month	2	1	2	2	2	2	2
1 to less than 6 months	11	18	10	7	9	13	10
6 to less than 12 months	13	13	13	12	13	13	12
12 to less than 18 months	11	11	11	13	10	10	13
18 to less than 24 months	12	9	13	13	12	11	12
24 to less than 30 months	20	22	16	19	22	18	19
30 to less than 36 months	17	12	20	18	18	17	16
36 months or longer	16	14	15	16	13	17	17
Average Number of Months Families Were Enrolled in Early Head Start	21	20	22	23	22	19	22
Sample Size	**1,214**	**252**	**554**	**408**	**455**	**410**	**283**

SOURCE: Exit interviews conducted near the time of the focus child's third birthday and information on dates of last contact with the family obtained from program staff in Summer 2000. Excludes one site that did not provide a date of last contact for most families.

NOTE: The percentages are average percentages across programs in any given group.

[a] Based on the date of the program's last contact with the family as reported by program staff in summer 2000 if the family had left the program by then or if no exit interview was completed, and on the number of months of participation reported by the family in the exit interview if the family left the program after the summer of 2000 and completed an exit interview.

D. LEVELS OF PARTICIPATION IN CORE CHILD DEVELOPMENT SERVICES

The Early Head Start programs took three main approaches to providing core child development services. Home-based programs provided these services primarily through home visits. Center-based programs provided child development services primarily through child care in Early Head Start centers. Mixed-approach programs provided home-based services to some families, center-based services to some families, and a mix of home- and center-based services to some families. Thus, home visits and child care in Early Head Start centers were the programs' primary vehicles for delivering child development services.[6]

Nearly 9 in 10 program group families received core child development services—either home visits, Early Head Start center care, or both (Table III.2). This percentage may underestimate the proportion of families who received core child development services, because some families received child development services in other child care settings under contract with an Early Head Start program during the combined follow-up period and our measure of core child development services captures only the services provided by Early Head Start directly.

The Head Start Program Performance Standards require programs to provide child development services through weekly home visits, at least 20 hours per week of center-based child care, or a combination of the two. Nearly two-thirds of families received core child development services at the required intensity during at least one of the three follow-up periods, and one-quarter received these services throughout the combined follow-up period. Families in home-based and mixed-approach programs were the most likely to receive core child development services at the required intensity level for at least one follow-up period (70 percent), compared with families in center-based programs (53 percent).

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[6] Parenting education was another important component of programs' child development services. We discuss participation in these services later in this chapter.

TABLE III.2

LEVELS OF PARTICIPATION IN CORE EARLY HEAD START CHILD DEVELOPMENT SERVICES, FOR THE FULL SAMPLE AND KEY PROGRAM SUBGROUPS

		Program Approach			Pattern of Implementation		
	Full Sample	Center-Based	Home-Based	Mixed-Approach	Early Implementers	Later Implementers	Incomplete Implementers
Percentage of Families Who Received:							
At least minimal core services[a]	89	80	91	92	94	88	83
More than minimal core services[b]	87	77	90	90	93	86	80
Percentage of Families Who Received Core Services at the Required Intensity Level for[c]:							
At least 1 follow-up period	66	53	70	70	79	62	56
At least 2 follow-up periods	43	40	47	40	57	37	33
Combined follow-up period	25	26	26	23	37	19	18
Sample Size	**940-1,020**	**166-205**	**476-478**	**298-338**	**310-351**	**330-359**	**301-311**

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after enrollment.

NOTE: The percentages are average percentages across programs in any given group and are weighted for nonresponse.

[a] At least one Early Head Start home visit and/or at least two weeks of Early Head Start center-based child care.

[b] More than one Early Head Start home visit and/or at least two weeks of Early Head Start center-based child care.

[c] Weekly Early Head Start home visits for home-based sites, at least 20 hours per week of Early Head Start center-based child care for center-based sites, and weekly Early Head Start home visits or at least 20 hours per week of Early Head Start center-based child care for mixed-approach sites.

The 75 percent of families who did not receive core child development services at the required intensity throughout the combined follow-up period does not necessarily indicate program failure to comply with the performance standards. The combined follow-up period covers the 28 months, on average, after families enrolled in Early Head Start. Families' length of participation in the program, however, averaged 21 months, with nearly half of the families participating for less than 24 months (Table III.1). Thus, the majority of families who did not receive core child development services at the required intensity during all three follow-up periods (the combined period) were not actually enrolled in the program throughout this entire period.

Early, full implementation appears to be associated with receipt of core child development services at the required intensity level. Early implementers provided these services to 79 percent of families for at least one follow-up period, compared to 62 percent of families in later implementers and 56 percent in incomplete implementers. Likewise, early implementers provided these services to nearly 40 percent of families throughout the combined follow-up period, compared to less than 20 percent of families served by later and incomplete implementers.

1. Early Head Start Home Visits

All Early Head Start programs are required to complete home visits, whether they are home-based, center-based, or provide a mix of services. In center-based programs, services are delivered primarily in Early Head Start child care centers, but staff are required to complete home visits with children and their families at least twice a year. They may meet with families in other places if staff safety would be endangered by home visits or families prefer not to meet at home.[7] Home visitors are required to visit families receiving home-based services at home weekly, or at least 48 times per year. In mixed-approach programs, some families receive home-based services, some receive center-based services, and some receive a combination of the two.

Across all three program types, 84 percent of families received at least one Early Head Start home visit, and almost all of these families received more than one visit (Table III.3). As expected, families in home-based and mixed-approach programs were most likely to receive at least one home visit (90 and 89 percent, respectively, compared with 65 percent of center-based programs). Across programs with different patterns of implementation, early implementers were most likely to provide at least one home visit (90 percent), followed by later implementers (84 percent), and incomplete implementers (76 percent).

Most families received home visits at least monthly. More than two-thirds received home visits monthly or more often during at least one of the three follow-up periods, and one-third received home visits at least monthly throughout the combined follow-up period. In home-based programs, 86 percent received monthly visits during at least one follow-up period, and nearly half received visits at least monthly during the combined follow-up period. Almost all of these visits lasted an hour or longer.

According to the revised Head Start Program Performance Standards, programs serving families through home-based services must provide weekly home visits to families. As noted in the implementation study, however, programs found it very challenging to complete visits with

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[7] Because our data on home visits do not include these out-of-home meetings, our estimates of home visit services may slightly underestimate the proportion of families who received these services.

TABLE III.3

LEVELS OF PARTICIPATION IN EARLY HEAD START HOME VISITS, FOR THE FULL SAMPLE AND KEY PROGRAM SUBGROUPS

		Program Approach			Pattern of Implementation		
	Full Sample	Center-Based	Home-Based	Mixed-Approach	Early Implementers	Later Implementers	Incomplete Implementers
Percentage of Families Who Received:							
Any Early Head Start home visits	84	65	90	89	90	84	76
More than 1 Early Head Start home visit	78	46	89	86	82	81	70
Percentage of Families Who Received Early Head Start Home Visits at Least Monthly for:							
At least 1 follow-up period	69	23	86	82	72	71	65
At least 2 follow-up periods	53	12	72	58	56	51	52
Combined follow-up period	32	4	47	34	38	27	32
Percentage of Families Who Received Early Head Start Home Visits at Least Weekly for:							
At least 1 follow-up period	52	5	70	62	56	51	48
At least 2 follow-up periods	31	0	47	34	38	28	27
Combined follow-up period	16	0	26	16	23	12	14
Percentage of Families Who Received Monthly Early Head Start Home Visits Lasting At Least One Hour for:							
At least 1 follow-up period	64	17	80	78	66	64	62
At least 2 follow-up periods	45	6	61	53	52	40	43
Combined follow-up period	25	2	36	29	33	18	24
Percentage of Families Who Received Weekly Early Head Start Home Visits Lasting At Least One Hour for:							
At least 1 follow-up period	48	3	64	60	54	45	45
At least 2 follow-up periods	29	0	43	31	37	24	25
Combined follow-up period	15	0	24	15	21	11	12
Sample Size	**1,007-1,029**	**206-210**	**470-480**	**331-339**	**346-351**	**353-364**	**308-314**

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after enrollment.

NOTE: The percentages are average percentages across programs in the given group and are weighted for survey nonresponse.

some families weekly.[8] Nevertheless, home-based programs were able to deliver weekly home visits to many families. Seventy percent of families in home-based programs reported receiving weekly visits during at least one follow-up period, nearly half received weekly visits during at least two periods, and one-quarter received weekly visits throughout the combined follow-up period.[9]

Based on the frequency of home visits families reported receiving during each of the three waves of follow-up interviews, we estimate that families received roughly 52 Early Head Start home visits, on average, during the 26 months after program enrollment (not shown).[10] As expected, families in home-based programs received the most home visits, on average (71 visits), followed by families in mixed-approach and center-based programs (65 and 11 visits). While these estimates are useful in providing a rough sense of the number of home visits families typically received, caution should be used in interpreting their precision. The estimates are based on families' reports of the typical home visit frequency during the relevant follow-up period, not on respondent reports or program records on the completion date of each home visit.

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[8] See *Pathways to Quality* (Administration on Children, Youth and Families 2002) for a more detailed discussion of the challenges program faced in completing home visits.

[9] As noted earlier, failure to provide services, such as weekly home visits, at the required intensity throughout the combined follow-up period should not be interpreted as failure to comply with the performance standards in serving these families. Because more than 40 percent of families participated in the program for less than 24 months, many families receiving home-based services did not participate in the program for the entire combined follow-up period (28 months after enrollment, on average).

[10] We calculated this estimate by adding together the estimated number of home visits received during each of the three follow-up periods and then prorating the estimate to 26 months after program enrollment (by multiplying the estimated number of home visits by 26 divided by the actual length of the follow-up period). Estimates for each follow-up period were derived by multiplying the reported frequency of home visits by the length of the follow-up period.

To better understand the reasons for variation in home visit frequency across families, local research partners at the University of Washington and the University of Missouri-Columbia examined associations between home visit frequency and various family characteristics. Boxes III.1 and III.2 describe their findings.

2. Early Head Start Center-Based Child Care

The revised Head Start Program Performance Standards require programs serving families through the center-based option to provide center-based child development services to children for at least 20 hours a week. This section describes families' participation in this core child development service during 26 months after they enrolled in the program. The next section describes program families' use of all types of child care, including care provided by Early Head Start and other providers in the community. Because the parent services follow-up interviews collected detailed information on families' use of child care services, including dates of arrangements, we constructed a 26-month timeline that contains information on all the child care arrangements reported during the three waves of parent services follow-up interviews. The follow-up period for child care services is 26 months (the period covered for nearly all families who completed the interviews) for all families, unless otherwise noted.

During their first 26 months in the program, 28 percent of all program group children received care in an Early Head Start center, including 71 percent of children in center-based programs and 30 percent of children in mixed-approach programs (Table III.4).[11] For 21 percent of all families in the sample, an Early Head Start center was their child's primary child care

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[11] As stated previously, these percentages do not include children who received center-based child development services in other child care settings under contract with an Early Head Start program. The percentage receiving care in an Early Head Start center reflects the lower participation rates in two center-based programs, as discussed above in Section B.

BOX III.1

PATTERNS OF PARTICIPATION IN HOME-BASED SERVICES

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We examined home visitor records to determine whether this suburban, Pacific Northwest Early Head Start program showed particular patterns of program participation. Of the 90 families recruited for the research program, 76 (84 percent) participated in three or more home visits (more than simply enrollment). All participants were expected to take part in weekly home visits. However, when participation results were analyzed, we identified two groups. The low-participation group ($n = 46$) had at least one visit per month for an average of 10.33 ($SD = 5.41$) months, while the high-participation group ($n = 30$) had at least one home visit per month for an average of 25.43 ($SD = 6.76$) months. Only 17 of these families, however, remained active until the focus child was 36 months old.

Content analysis of home visit records revealed 14 target content topics for home visits.[1] The percent of home visits that focused on target content topics varied between the high- and low-participation groups. For example, 58 percent of the home visits to the high-participation group included specific content on the growth and development progress of the focus child, while only 33 percent of the low-participation group visits focused on this topic ($p<.01$). Similarly, 47 percent of the home visits to the high-participation group included child play activities, compared with 21 percent of the home visits to the low-participation group ($p<.01$). The topic of housing was also associated with longevity in the program. In the high-participation group, 9 percent of home visits included discussions of housing issues, compared with 18 percent in the low-participation group ($p<.05$).

A primary goal of this program was to facilitate a secure parent-child attachment relationship. To that end, the research team and the home visitors developed 10 parent-child communication intervention (PCCI) protocols, which the home visitors delivered. They delivered these protocols in home visits to 44 percent of the low-participation group and 32 percent of the high-participation group ($p<.05$). However, the high-participation group completed more PCCI protocols than did the low-participation group (3.3 versus 1.5, $p<.01$). In addition, caregivers whose adult attachment representations, as measured by the Adult Attachment Interview[2] were classified as insecure and unresolved due to trauma/loss (28 participants) completed fewer PCCI protocols than did caregivers who were not unresolved, regardless of their security classification (1.8 versus 2.7, $p<.05$).

Caregiver adult attachment classification and housing needs at the time of enrollment were both related to patterns of program participation. Caregivers who had insecure attachment (see Hesse 1999) were more likely to be in the low-participation group ($p<.05$), as were participants who initially identified housing as a need ($p<.1$). However, housing needs identified at enrollment were not significantly related to the discussion of housing issues during home visits. These findings suggest that assessment at enrollment should include a measure of post-traumatic stress, since 37 percent of the sample was coping with unresolved trauma and loss, and this factor was related to their level of participation in the program. Early Head Start programs also need to address effectively the issue of safe, adequate housing. Further research is needed to understand the relationships between unresolved trauma and loss, housing problems, and program participation.

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[1] The target content topics were observations of child growth and development, child play/recreation, child health, child assessment, child care, parent development, PCCI protocols, employment, caregiver health, caregiver assessment, education, family recreation, housing, and information and referral.

[2] Hesse, E. "The Adult Attachment Interview: Historical and Current Perspectives." In Handbook of Attachment: Theory, Research, and Clinical Applications, edited by J. Cassidy and P.R. Shaver. New York: The Guilford Press, 1999, pp. 395-433.

BOX III.2

RELATIONS AMONG MOTHER AND HOME VISITOR PERSONALITY TRAITS, RELATIONSHIP QUALITY, AND AMOUNT OF TIME SPENT IN HOME VISITS

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In response to the low frequency of home visits in programs across the country (Gomby et al. 1999), the current study examined associations between mother and home visitor personality, the quality of mother-home visitor relationships, and the amount of time spent in home visits. We hypothesized that the quality of the mother-home visitor bond mediates links between their personality characteristics and time in home visits.

The participants were 41 African American, low-income, first-time mothers enrolled in an Early Head Start program in a large, Midwestern city, and five home visitors. Most of the mothers were in their late teens or early 20s and had limited education.

The mothers and home visitors completed the Multidimensional Personality Questionnaire, Form NZ (Tellegen 1982). Home visitors also completed the Bond Subscale of the Working Alliance Inventory (Short Form) (Horvath and Greenberg 1989). The dependent variable was participation, defined as the mean number of minutes per month spent with each mother in home visits, based on three months to two years of visits.

The results of hierarchical linear modeling did not support our mediational hypotheses. However, significant associations emerged among the personality, relationship, and participation variables. Maternal personality traits that showed orientation toward control and achievement were negatively related to home visit participation. On the other hand, maternal tendencies to feel vulnerable or taken advantage of (for example, high stress reaction and alienation) were positively related to participation. Maternal stress reaction and alienation were also positively linked to home visitor ratings of bond quality. Home visitor stress reaction was negatively related to participation. Finally, the quality of mother-home visitor bond was positively related to participation.

One explanation for these findings may be that home visitors thought home visits were especially important for highly stressed mothers who are low in control and in striving for achievement, because the services come to the mothers; the mothers do not have to take the initiative to go to the services. Moreover, highly stress-prone mothers may have been more likely to draw the home visitors into personal relationships because they had more issues to address. If home visitors perceived achievement-oriented mothers as more capable of meeting their own needs, they may have made fewer attempts to schedule visits to them.

The stress-proneness of home visitors may be related to their skills in establishing relationships. It may be especially important for social service providers whose work takes them into high-stress situations to have a positive, less stress-prone personality. Individuals with a negative, more stress-prone personality may find the difficult circumstances of parents like those in our sample overwhelming.

References

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Horvath, A.O., and L.S. Greenberg. "Development and Validation of the Working Alliance Inventory." *Psychological Assessment*, vol. 1, 1989, pp. 207-210.

Tellegen, A. *Brief Manual for the Multidimensional Personality Questionnaire*. Unpublished manuscript. University of Minnesota, Minneapolis, 1982.

TABLE III.4

LEVELS OF PARTICIPATION IN EARLY HEAD START CENTER-BASED CHILD CARE, FOR THE FULL SAMPLE AND KEY PROGRAM SUBGROUPS

		Program Approach			Pattern of Implementation		
	Full Sample	Center-Based	Home-Based	Mixed-Approach	Early Implementers	Later Implementers	Incomplete Implementers
Percentage of Children:							
Who ever received Early Head Start care	28	71	1[b]	30	38	27	17
For whom Early Head Start care was the primary arrangement[a]	21	57	1	20	30	18	12
Percentage of Children Who Were In Early Head Start Care For:							
0 hours per week	75	31	99	76	66	76	85
1-9 hours per week	10	25	0	12	12	11	7
10-19 hours per week	7	16	0	8	9	6	4
20-29 hours per week	4	14	0	2	7	4	1
30-39 hours per week	2	6	0	0	3	1	1
40 or more hours per week	2	6	0	1	3	0	1
Average hours per week	4	12	0	3	6	3	2
Average Total Hours That Children Were In Early Head Start Care	450	1,391	9	336	701	347	273
Percentage of Children Who Were in Early Head Start Care For:							
0% of the follow-up period	72	29	99	70	62	74	83
1-19% of the follow-up period	3	4	0	5	4	2	3
20-39% of the follow-up period	3	8	0	6	3	5	4
40-59% of the follow-up period	3	5	0	4	4	3	1
60-79% of the follow-up period	3	7	0	4	5	2	2
80-99% of the follow-up period	7	15	0	8	6	8	4
100% of the follow-up period	9	31	0	4	16	6	3
Sample Size	**918-1,010**	**175-211**	**444-458**	**297-341**	**308-346**	**316-375**	**284-302**

TABLE III.4 (*continued*)

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after enrollment.

NOTE: The percentages are average percentages across programs in the given group and are weighted for survey nonresponse.

[a] Arrangements that children were in for the largest number of hours during the follow-up period.

[b] These child care arrangements were identified by respondents as Early Head Start center-based child care. The arrangements may be slots that were provided by an Early Head Start program through contracts with community providers or slots in another Early Head Start program in the community, or respondents may have reported them as Early Head Start arrangements in error.

arrangement (the arrangement the child was in for the greatest number of hours during the 26 months after program enrollment). In center-based programs, 57 percent of families used an Early Head Start center as their child's primary arrangement. Early Head Start centers served as the primary arrangement for 20 percent of families in mixed-approach programs.

On average, program group children received 450 hours (about 4 hours a week) of care in an Early Head Start center.[12] As expected, children in center-based programs received more than three times as many hours of Early Head Start center care—1,391 hours (about 12 hours per week), on average. In mixed-approach programs, children received 336 hours (about 3 hours a week, on average) of Early Head Start center care. In addition to receiving more hours of Early Head Start center care, on average, children enrolled in center-based programs were more likely to receive this care continuously. Nearly a third of families in center-based programs used care in an Early Head Start center continuously during the 26 months after enrollment, and more than half used it for at least half of this period.

Children served by early implementers were most likely to receive care in an Early Head Start center (38 percent), compared to later implementers (27 percent) and incomplete implementers (17 percent). Children served by early implementers also received more than twice as many hours of care in an Early Head Start center, on average, than children served by later and incomplete implementers.[13] In the two center-based programs that were early implementers, children received an average of 2,028 hours of Early Head Start center care (about 18 hours per week, on average).

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[12] The average total number of hours of Early Head Start care is the number of hours averaged across all program group focus children, including those who did not receive any Early Head Start center care.

[13] Two of the four center-based programs were early implementers, one was a later implementer, and one was an incomplete implementer.

E. USE OF CHILD CARE SERVICES

Rates of child care use were high across all three program types and patterns of implementation. Almost all program group families used child care (86 percent) for the focus child at some point during the 26 months after enrollment in Early Head Start (Table III.5) In this section we describe program families' use of center-based care; use of multiple care arrangements; types of primary care providers; care during nonstandard work hours; total hours children were in child care; duration of child care use over the 26-month follow-up period; and out-of-pocket costs of child care to families.

More than half of program group children received care in a child care center for at least two weeks during the 26 months after enrollment. As expected, families in center-based programs were most likely to receive center-based care (79 percent), followed by those in mixed-approach programs (52 percent) and home-based programs (33 percent). Families served by early implementers were also more likely to use center-based care (56 percent), compared with later and incomplete implementers (50 and 45 percent).

During the 26 months after enrollment, 64 percent of children received care in more than one child care arrangement, and over half received care in more than one arrangement concurrently. On average, program group children received care in two child care arrangements during their first 26 months in Early Head Start. Fifty-two percent received care in more than one arrangement concurrently at some point during this period. Nearly three-quarters of the children in center-based programs were cared for in concurrent arrangements, suggesting that Early Head Start centers did not provide care during all the hours that families needed it.

TABLE III.5

CHILD CARE ARRANGEMENTS USED BY EARLY HEAD START FAMILIES, FOR THE FULL SAMPLE AND KEY PROGRAM SUBGROUPS

		Program Approach			Pattern of Implementation		
	Full Sample	Center-Based	Home-Based	Mixed-Approach	Early Implementers	Later Implementers	Incomplete Implementers
Percentage of Children:							
Who received any child care	86	93	80	89	87	82	90
Who received any center-based child care	51	79	33	52	56	50	45
Percentage of Children Who Received Care in the Following Number of Arrangements:							
0	14	7	20	11	13	18	10
1	22	15	24	23	21	20	25
2	25	25	24	26	24	23	28
3	20	26	17	20	21	18	21
4 or more	20	27	16	20	21	22	16
Average number of arrangements used	2	3	2	2	2	2	2
Percentage of Children Who Received Care in More than One Arrangement Concurrently	52	73	39	53	56	48	50
Percentage of Children Whose Primary Child Care Arrangement Was[a]:							
Not in child care	14	7	20	11	13	19	10
Early Head Start/Head Start	21	57	1	20	30	18	12
Other child care center	17	10	20	17	16	17	19
Nonrelative	14	5	19	14	12	10	22
Parent or stepparent	8	5	9	7	8	5	10
Grandparent or great-grandparent	18	12	19	21	16	20	19
Other relative	8	3	10	9	3	11	8
Parent at school or work	0	0	1	0	1	0	0
Percentage of Children Whose Primary Arrangement Included Care During:							
Evenings	30	25	31	32	31	29	31
Early mornings	49	42	53	50	47	49	52
Weekends	17	11	18	21	15	17	21
Overnight	22	12	33	16	13	37	15
Sample Size	**920-988**	**189-206**	**410-459**	**306-323**	**311-330**	**330-388**	**273-293**

TABLE III.5 (*continued*)

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after enrollment.

NOTE: The percentages are average percentages across programs in the given group and are weighted for survey nonresponse.

[a] Arrangements that children were in for the largest number of hours during the follow up period.

Program families used a wide range of providers for their primary child care arrangement (the arrangement focus children were in for the greatest number of hours) during the 26 months after program enrollment. Thirty-eight percent of families used a child care center as their primary child care arrangement, including 21 percent who used an Early Head Start center and 17 percent who used other child care centers in the community. One-third of families used child care provided by a relative—most often, a grandparent or great-grandparent—as their primary child care arrangement. Fourteen percent of families used care provided by an unrelated family child care provider. Finally, 14 percent of families did not use any child care for the focus child during the 26 months after program enrollment.

Families reported that a substantial proportion of the primary child care arrangements they used offered care during nonstandard work hours. Nearly half of the primary child care arrangements used by program families offered care during early morning hours. Nearly a third offered care during evenings hours. Smaller proportions offered care during weekends (17 percent) and overnight (22 percent).

Most program children received child care for substantial amounts of time during the 26 months after program enrollment. On average, program group families used 1,483 hours (about 14 hours per week) of child care during the 26 months following enrollment; one-quarter used child care for at least 20 hours a week (a total of 2,253 hours) during this period (Table III.6).[14] Program group children received 688 hours of center care, or about six hours per week, on average. As expected, families in center-based programs used the most child care (2,354 hours, or 21 hours per week), on average, followed by mixed-approach programs (1,458 hours or 14

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[14] The average total number of hours in child care is the number of hours averaged across all program group children, including those who did not use any child care during the 26 months after program enrollment.

TABLE III.6

INTENSITY OF CHILD CARE USE BY EARLY HEAD START FAMILIES, FOR THE FULL SAMPLE AND KEY PROGRAM SUBGROUPS

		Program Approach			Pattern of Implementation		
	Full Sample	Center-Based	Home-Based	Mixed-Approach	Early Implementers	Later Implementers	Incomplete Implementers
Average Number of Hours That Children Were In:							
Any child care	1,483	2,354	1,007	1,458	1,466	1,251	1,782
Any center-based child care	688	1,580	266	586	894	549	609
Percentage of Children Who Were in Any Child Care For:							
0 hours per week	14	7	21	12	13	19	10
1-9 hours per week	39	28	45	41	42	39	37
10-19 hours per week	22	24	19	23	18	22	26
20-29 hours per week	11	15	8	12	11	12	9
30-39 hours per week	6	11	4	6	8	4	8
40 or more hours per week	7	15	4	7	8	5	10
Average hours per week	14	21	9	14	14	12	16
Percentage of Children Who Were in Any Center-Based Child Care For:							
0 hours per week	58	23	79	58	50	61	65
1-9 hours per week	18	27	12	21	21	17	16
10-19 hours per week	12	22	5	12	13	13	9
20-29 hours per week	6	13	2	6	8	7	3
30-39 hours per week	2	8	1	1	4	1	3
40 or more hours per week	3	8	1	2	4	1	4
Average hours per week	6	14	3	5	8	5	5
Percentage of Children Who Were in Any Child Care For:							
0% of the follow-up period	15	7	22	12	13	20	10
1-19% of the follow-up period	7	2	11	6	7	9	5
20-39% of the follow-up period	10	4	11	14	10	11	10
40-59% of the follow-up period	10	7	11	12	12	9	10
60-79% of the follow-up period	11	9	15	14	12	13	14
80-99% of the follow-up period	18	16	15	21	18	14	23
100% of the follow-up period	26	53	16	20	28	22	29

TABLE III.6 (*continued*)

		Program Approach			Pattern of Implementation		
	Full Sample	Center-Based	Home-Based	Mixed-Approach	Early Implementers	Later Implementers	Incomplete Implementers
Percentage of Children Who Were in Any Center-Based Child Care For:							
0% of the follow-up period	50	21	68	48	44	52	55
1-19% of the follow-up period	8	4	10	8	7	7	9
20-39% of the follow-up period	8	8	7	10	9	8	9
40-59% of the follow-up period	6	5	5	10	7	8	5
60-79% of the follow-up period	8	8	6	8	7	8	7
80-99% of the follow-up period	10	19	3	10	11	9	10
100% of the follow-up period	10	35	1	5	17	8	5
Sample Size	**818-1,005**	**172-211**	**380-459**	**266-338**	**285-343**	**286-388**	**247-289**

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after enrollment.

NOTE: The percentages are average percentages across programs in the given group and are weighted for survey nonresponse.

hours per week), and home-based programs (1,007 hours or 9 hours per week). Families in center-based programs also used the most center care, on average (1,580 hours).[15]

In addition, most program children were in child care during a large proportion of the 26 months following enrollment in Early Head Start. More than half of families used child care for at least half of the 26-month period, and one-quarter used child care continuously throughout the 26 months following enrollment. Families in center-based programs were most likely to use child care continuously throughout the 26 months following enrollment. More than half used child care continuously, and more than one-third used center-based child care continuously.

On average, program families spent $513 out of their pocket for child care during the 26 months after program enrollment (Table III.7).[16] Some received free child care from relatives or in an Early Head Start child care center. Thirty percent of program families received individual child care subsidies or vouchers to help pay for child care.[17] Families in home-based programs were most likely to use a child care subsidy or voucher (37 percent), followed by families in mixed-approach programs (29 percent) and center-based programs (19 percent). Most families whose children received care in an Early Head Start center did not obtain individual child care subsidies or vouchers to help to pay for the care. Only seven percent of families in center-based

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[15] The discrepancy between overall use of center care and use of Early Head Start center-based care by families in center-based programs is probably due to use of other community centers by families who moved or left Early Head Start for other reasons.

[16] The average out-of-pocket child care cost during the 26-month follow-up period is the cost averaged across all program group children, including those who did not use any child care and those who received free child care during the 26 months after program enrollment.

[17] On follow-up surveys, parents were asked if they received a special check or voucher to pay for each child care arrangement. Thus, the percentages reported here include child care subsidies that parents received in the form of vouchers, but do not include subsidized child care provided through slots contracted directly by the state or free care provided by Early Head Start.

TABLE III.7

OUT-OF-POCKET CHILD CARE EXPENSES AND RECEIPT OF CHILD CARE SUBSIDIES, FOR THE FULL SAMPLE OF EARLY HEAD START FAMILIES AND KEY PROGRAM SUBGROUPS

		Program Approach			Pattern of Implementation		
	Full Sample	Center-Based	Home-Based	Mixed-Approach	Early Implementers	Later Implementers	Incomplete Implementers
Average Total Out-Of-Pocket Child Care Expenses	$513	$481	$469	$584	$482	$398	$686
Percentage of Families Who Ever Received a Subsidy to Pay for the Focus Child's Care In:							
Any child care arrangement	30	19	37	29	27	27	37
Any child care center	17	16	15	20	18	17	16
An Early Head Start center	4	7	0	7	7	5	1
Sample Size	**731-988**	**165-206**	**309-459**	**257-323**	**251-327**	**252-388**	**228-295**

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after enrollment.

NOTE: The percentages are average percentages across programs in the given group and are weighted for survey nonresponse.

programs and seven percent in mixed-approach programs reported obtaining an individual child care subsidy or voucher to pay for care in an Early Head Start center.

F. RECEIPT OF OTHER CHILD DEVELOPMENT SERVICES

In addition to home visits and center-based child care, the research programs provided a range of other child development services to families. This section describes levels of service use and the intensity of these other child development services, including parenting education, parent-child group socializations, health services for children, and services for children with disabilities.

1. Parenting Education and Parent-Child Group Socializations

Almost all families (94 percent) received parenting education services from Early Head Start or other programs, often from home visitors (85 percent) or case managers (82 percent) (Table III.8). Most families also reported participating in group parenting activities (71 percent). Parents most often reported participating in parenting classes (62 percent), followed by parent-child group socialization activities (41 percent), and parent support groups (20 percent). Families in mixed-approach programs were most likely to report receiving parenting education services (97 percent), followed by families in home-based and center-based programs (94 and 88 percent). In addition, early implementers provided parenting education services to a higher proportion of families (98 percent) than did later and incomplete implementers (93 and 89 percent).

To illustrate the important role that Early Head Start programs play in linking families with opportunities to learn about their children's development, the local research report in Box III.3 describes the role that one research program played in helping monolingual Spanish-speaking families access parenting education services.

TABLE III.8

LEVELS OF PARTICIPATION IN PARENTING EDUCATION SERVICES AND PARENT-CHILD GROUP SOCIALIZATION ACTIVITIES, FOR THE FULL SAMPLE OF EARLY HEAD START FAMILIES AND KEY PROGRAM SUBGROUPS

		Program Approach			Pattern of Implementation		
	Full Sample	Center-Based	Home-Based	Mixed-Approach	Early Implementers	Later Implementers	Incomplete Implementers
Percentage of Families Who Received:							
Any parenting education services	94	88	94	97	98	93	89
Parenting education from a home visitor	85	66	92	90	90	85	78
Parenting education from a case manager	82	65	87	88	86	81	79
Percentage of Families Who Ever Participated In:							
Any group activities for parents/parents and children	71	68	72	71	77	68	66
Parenting education classes	62	60	63	63	70	58	58
Parenting support groups	20	20	21	20	21	21	18
Group socialization activities for parents and children	41	29	45	46	44	45	33
More than one group socialization activity	37	23	42	42	40	42	29
Percentage of Families Who Participated in Group Socialization Activities At Least Monthly During:							
At least 1 follow-up period	26	12	32	30	28	30	21
At least 2 follow-up periods	9	3	14	8	14	9	5
Combined follow-up period	2	0	3	1	4	1	0
Sample Size	**956-1,031**	**193-211**	**448-481**	**314-339**	**327-352**	**336-365**	**293-314**

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after enrollment.

NOTE: The percentages are average percentages across programs in the given group and are weighted for survey nonresponse.

BOX III.3

PARENTS' PERCEPTIONS OF TRAINING AND SERVICE ACTIVITIES REGARDING THEIR CHILD'S NURTURING AND DEVELOPMENT: IMPLEMENTATION AND BENEFITS OF EARLY HEAD START

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Among the predominantly Mexican and Mexican American families of the rural areas served by the Washington State Migrant Council's Early Head Start Program (WSMC-EHS), *la familiá* (the family) is extremely important in WSMC-EHS's mission to enhance the families' contributions to their communities. The impact of Early Head Start in supporting and strengthening the family unit was considered a crucial element and fundamental to increasing parents' abilities to nurture their children's early development. Further, the interplay of cultural variables, particularly language and acculturation, were seen as some of the more prominent potential moderators of that impact. The Yakima Valley Early Head Start Research Project wanted to determine whether families participating in Early Head Start partook of child nurturing and development services that they would not have received otherwise and whether they thought they and/or their children had benefited from those services.

We found that distances, limited tax bases, and sparse population distributions present challenges for providing child care and child development, social, and health services in rural areas. An array of services are available in the Lower Yakima Valley, however. These include state-funded child development and child care, privately supported child care programs, mental health services, and a county cooperative of agencies. While available, it is difficult for low-income families who depend on seasonal agricultural work, experience language or cultural barriers, and have limited educational backgrounds to access them. These limitations were important factors in the evaluation of WSMC-Early Head Start.

Few control group families reported involvement in education, training, or support pertaining to child care or child nurturing. Most did not obtain center- or home-based services on their own initiative. On the other hand, most Early Head Start families reported frequent opportunities for, and participation in, activities pertaining to their child's care and development, in some cases attaining an eight-fold advantage. Early Head Start staff carried out or arranged most of these activities, and activities usually occurred in the home. The Early Head Start program staff gave the most attention to monolingual Spanish-speaking families.

Early Head Start participation produced considerable benefits. Early Head Start families showed a trend toward greater confidence in child care and child development abilities. While a standard index of acculturation showed little change and few group differences, indicators of functional acculturation—family and community participation—suggested Early Head Start families had enhanced involvement in selected areas.

Studies of child development programs often focus on the content and character of training, services, and support pertaining to child care and child nurturing. Although these studies may address substantive aspects of the implementation of best practice, the "how" of service delivery is of little importance if it is too limited in frequency, uneven, or not sustained. The WSMC-EHS program's effort is aimed at complying with Head Start guidelines, and the families it serves have demonstrated a level of involvement and benefit they would not likely have attained otherwise.

The revised Head Start Program Performance Standards require programs providing home-based services to provide families with two parent-child group socialization activities each month. As noted in the implementation study, programs found it very challenging to gain families' participation in regular parent-child group socialization activities.[18] Less than half of families in home-based and mixed-approach programs (45 and 46 percent) reported participating in parent-child group socialization activities. Less than a third of families in center-based programs (29 percent) reported participating in these activities. Moreover, only a third of families in home-based programs participated in parent-child group socialization activities monthly or more often during at least one follow-up period, and only three percent participated at least monthly throughout the combined follow-up period.

2. Child Health Services

The revised Head Start Program Performance Standards require programs to ensure that all children have a regular health care provider and access to needed health, dental, and mental health services. Within 90 days of enrollment, programs must assess whether each child has an ongoing source of health care, obtain a professional determination as to whether each child is up-to-date on preventive and primary health care, and develop and implement a follow-up plan for any health conditions identified.

All children received some health care services during the combined follow-up period, and nearly all children (99 percent) received immunizations (Table III.9). Moreover, nearly all children visited a doctor (99 percent); 95 percent had at least one check-up and 83 percent were treated for an illness. On average, program group children visited a doctor seven times for a

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[18] See *Pathways to Quality* (Administration on Children, Youth, and Families 2002) for a more detailed description of the challenges programs encountered in gaining families' participation in regular parent-child group socialization activities.

TABLE III.9

RECEIPT OF CHILD HEALTH SERVICES BY EARLY HEAD START CHILDREN, FOR THE FULL SAMPLE AND KEY PROGRAM SUBGROUPS

		Program Approach			Pattern of Implementation		
	Full Sample	Center-Based	Home-Based	Mixed-Approach	Early Implementers	Later Implementers	Incomplete Implementers
Percentage of Children Who Received Any Health Services	100	100	100	100	100	100	100
Percentage of Children Who Ever Visited:							
A doctor	99	99	99	98	100	98	99
A doctor for a check-up	95	95	96	94	97	93	95
A doctor for treatment of an illness	83	84	76	90	93	80	74
A dentist	29	38	28	24	32	29	24
An emergency room	54	58	53	53	62	46	55
Average Number of Visits To:							
A doctor for a check-up	7	6	7	7	7	6	7
A doctor for treatment of an illness	6	7	6	6	8	5	6
An emergency room	2	2	2	1	2	1	2
Percentage of Children Who Ever Received:							
An immunization	99	99	99	99	99	98	99
Any screening or testing	67	70	62	71	65	64	73
A hearing test	41	52	34	41	38	43	41
A lead test	28	28	27	30	22	23	42
Sample Size	**972-1,031**	**203-211**	**454-481**	**313-340**	**341-352**	**326-358**	**304-314**

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after enrollment.

NOTE: The percentages are average percentages across programs in the given group and are weighted for survey nonresponse.

check-up and six times for treatment of an illness during the combined follow-up period. In addition, more than half of the children (54 percent) visited an emergency room.

Twenty-nine percent of the children visited a dentist during the combined follow-up period. Children in center-based programs were more likely to visit a dentist than those in home-based and mixed-approach programs (38 percent, compared with 28 and 24 percent). Children served by early implementers also were more likely to visit a dentist than children served by later implementers or incomplete implementers (32 percent compared with 29 and 24 percent). Two-thirds of the children received at least one health screening test during the combined follow-up period, such as a hearing test, a lead test, or a urinalysis. Children in center-based and mixed-approach programs were more likely to receive a screening test than children in home-based programs (70 and 71 percent compared with 62 percent).

3. Services for Children with Disabilities

According to the revised Head Start Program Performance Standards, at least 10 percent of programs' caseloads must consist of children with identified disabilities. In Box III.4, a local researcher from Catholic University describes the opportunities and challenges Early Head Start programs face in serving children with disabilities. Eight percent of families in the research sample ever reported that their child was eligible for early intervention services during the combined follow-up period (Table III.10). The proportion of children ever reported to be eligible for early intervention services ranged from 2 to 22 percent across programs (not shown). In five programs, at least 10 percent of children were ever reported to be eligible for early intervention services (not shown).

These percentages are based solely on parents' reports. It is possible that parents underreported their children's eligibility for early intervention services (they may have been unaware of their child's eligibility or may not have recognized the name of the local Part C

BOX III.4

OPPORTUNITIES AND CHALLENGES IN PROVIDING SERVICES TO CHILDREN WITH DISABILITIES WITHIN EARLY HEAD START

Shavaun Wall
The Catholic University of America

The Head Start Program Performance Standards require programs to use at least 10 percent of their available spaces to serve children with disabilities and to make intensive efforts to recruit children with disabilities. Services for children under age 3 are mandated by Part C of IDEA 1997 (Individuals with Disabilities Education Act). To assist in identifying and serving infants and toddlers with disabilities, Early Head Start is participating in new initiatives to help communities refine coordination at the local level. The Hilton/EHS Training Program (sometimes known as Special Quest), sponsored by the Conrad Hilton Foundation in partnership with the Head Start Bureau, trains community teams to develop systems to identify, refer, and serve children with special needs that are sensitive to community context. Identifying, referring, and providing services to children with disabilities brings a number of opportunities but also introduces special challenges for Early Head Start programs.

Opportunities

Early Head Start offers an enhanced opportunity to identify children at the youngest ages. In some cases, very early identification may prevent later problems for the child and/or may make it possible for some of the contributing conditions to be mitigated. A national study of children and families who are receiving Part C services found that low-income children and children who are members of minority groups are least likely of all groups to be identified for special education services at the youngest ages. Early Head Start has the opportunity to close this gap in services.

Early Head Start and Part C service providers have new opportunities to coordinate services, develop partnerships, and thus maximize services according to family needs and community resources. The Hilton/EHS Training Program is assisting communities in building partnerships that provide a lasting foundation for improving services for children with disabilities. Teams in 237 communities have been trained to date.

Early Head Start works with many community partners in addition to Part C, for example, community child care providers. Early Head Start can work with Part C in enabling children's special education services to be delivered in children's natural settings, such as their child care environments and at Early Head Start programs.

Challenges

Usually only the most severe disabilities are identified at birth; most delays and disabilities emerge over time. The period from birth to age 3 is characterized by rapid growth and change, and children grow at their own unique rates, so a broad range of developmental variety is encompassed by notions of "typical" growth. Thus, staff in Early Head Start programs must be very vigilant in observing children's early development in order to identify conditions that may qualify children for Part C services.

It is more difficult to define disability for infants and toddlers than might be assumed. The performance standards themselves do not define disability but rely upon eligibility as defined under Part C. However, definitions vary dramatically across states, for example, in the degree of developmental delay that delineates eligibility for Part C. Referral procedures also vary considerably across states.

Communities are in the early stages of learning to coordinate Early Head Start and Part C services, and Part C providers may not be aware of the services offered by Early Head Start. One recent study revealed that while Early Head Start staff interviewed clearly understood Part C eligibility requirements in the five jurisdictions studied, the purpose of Early Head Start and the benefits children and families might derive from being served by both Early Head Start and Part C were often not equally apparent to Part C program staff.[1]

It is sometimes challenging for Early Head Start programs to identify children with delays or disabilities. The performance standards emphasize ongoing screening for emerging health issues and "developmental, sensory and behavioral concerns." This establishes a primary role for Early Head Start in serving as an early warning system that identifies potential developmental problems in very young children from economically disadvantaged families. These children are at higher risk for developing delays or disabilities and much less likely to access early intervention services than children from more affluent families. This role is consistent with the history of Head Start, which had as its inspiration successful experimental early intervention programs for children with mental retardation. In addition, there is no universal agreement about criteria for developmental delay among children under age 3.

Staff must be skilled in conducting culturally-sensitive screenings, monitoring ongoing child development, and supporting the active participation of disadvantaged families. Staff may need to balance the needs of children with disabilities with other urgent needs of economically disadvantaged families. Many of these needs also pose barriers to acting on behalf of an individual child. Finally, it takes intensive effort for Early Head Start staff to help families navigate as independently as possible unfamiliar and complicated service systems, secure referrals and assessments, and access early intervention services provided through Part C.

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[1] Summers, Jean Ann, Tammy Steeples, Carla Peterson, Lisa Naig, Susan McBride, Shavaun Wall, Harriet Liebow, Mark Swanson, and Joseph Stowitschek. "Policy And Management Supports For Effective Service Integration in Early Head Start and Part C Programs." *Topics in Early Childhood Special Education.* 21(1):16-30, 2001.

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TABLE III.10

DISABILITY INDICATORS AND RECEIPT OF EARLY INTERVENTION SERVICES BY EARLY HEAD START CHILDREN, FOR THE FULL SAMPLE AND KEY PROGRAM SUBGROUPS

		Program Approach			Pattern of Implementation		
	Full Sample	Center-Based	Home-Based	Mixed-Approach	Early Implementers	Later Implementers	Incomplete Implementers
Percentage of Children Who Were Ever Reported By Parents to:							
Be eligible for early intervention services	8	8	8	7	7	6	10
Have received early intervention services	6	5	6	4	5	5	7
Percentage of Children Whose Parents Reported Indicators of Disabilities:							
Level 1: Eligibility for early intervention services or first-level diagnosed condition	14	16	14	13	13	12	14
Level 2: Functional limitation or second-level diagnosed condition	18	18	20	18	20	18	15
Percentage of Children Reported by Program Staff to Be Part C-Eligible by Summer 2000	12	14	12	12	15	9	13
Sample Size	**1,028-1,075**	**216-234**	**427-490**	**318-358**	**331-368**	**301-401**	**274-304**

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after enrollment.

NOTE: The percentages are average percentages across programs in the given group and are weighted for survey nonresponse. Level 1 diagnosed conditions indicate eligibility for early intervention services and include a diagnosed hearing problem, severe or profound hearing loss, difficulty hearing or deafness, vision problem, difficulty seeing or blindness, speech problem, mobility problem, mental retardation, emotional disturbance, cleft palate, or a serious condition that showed up at birth or soon after, such as Down Syndrome, Turner's Syndrome, or spina bifida. Level 2 diagnosed conditions, which may indicate eligibility for early intervention services, include crossed eyes or nearsightedness, epilepsy or seizures, hyperactivity, or a developmental delay. Functional limitations include possible hearing and vision problems, communication problems, trouble with arm/hand or leg/foot, and use of special equipment to get around.

program). According to reports by program staff in summer 2000, 12 percent of children in the research sample had been identified as eligible for Part C, ranging from 4 to 30 percent across programs.[19] In nine programs, at least 10 percent of children in the research sample had been identified as eligible for Part C (not shown).

These percentages do not necessarily reflect the percentage of children with identified disabilities served by the programs at any given point in time. Follow-up interviews occurred over a 28-month period, on average, during which programs also served other families who were not in the research sample but who may have had children with identified disabilities.

Not all families who reported that their child was eligible for early intervention services reported that they had received early intervention services by the time of the third parent services follow-up interview. This may reflect, in part, the time required to set up services after identification. On average, 6 percent of families reported receiving early intervention services, ranging from 0 to 16 percent across programs (not shown). Four percent also reported that their child's early intervention services were being coordinated with the Early Head Start program, ranging from 0 to 12 percent across programs (not shown). Some parents with children who had been identified as eligible for Part C may not have recognized that their child was receiving early intervention services because the services were well-coordinated with Early Head Start services.

In addition to parents' reports of their child's eligibility for, and receipt of, early intervention services, parents' reports of diagnosed impairments provide another indication of children's disability status that is not tied to parents' awareness of their child's eligibility for, and receipt of, early intervention services (which may be coordinated with Early Head Start services and are not easily distinguishable to some parents). We defined two levels of indicators of potential disabilities to summarize the information that parents provided. The first level indicates whether the parent ever reported that the child was eligible for early intervention services *or* a doctor ever told the parent that the child had one or more of the following conditions (which would indicate eligibility for early intervention services): hearing problem, severe or profound hearing loss, difficulty hearing or deafness, vision problem, difficulty seeing or blindness, speech problem, mobility problem, mental retardation, emotional disturbance, cleft palate, or a serious condition that showed up at birth or soon after, such as Down Syndrome, Turner's Syndrome, or spina bifida. The second level indicates whether the parent ever reported that the child had various functional limitations or ever had other diagnosed conditions, including crossed eyes or nearsightedness, epilepsy or seizures, hyperactivity, or a developmental delay, which might make the child eligible for early intervention services.

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[19] Early intervention services are provided by agencies designated under Part C of the Individuals with Disabilities Education Act (IDEA) Amendments of 1997 (PL105-17) to be responsible for ensuring that services are provided to all children with disabilities between birth and age 2.

According to the first-level indicator (based on parents' reports of children's eligibility for early intervention services and information on children's diagnosed conditions), 14 percent of children, on average, may have had disabilities at some time by the third followup (an average of 28 months after enrollment, when children were, on average, 32 months old) (Table III.10). According to this indicator, the proportion of children whose parents ever reported potential disabilities ranged from 3 to 34 percent across programs; this proportion was at least 10 percent in 10 programs. The proportion did not differ substantially among center-based, home-based, and mixed-approach programs, nor did it vary substantially among early, later, and incomplete implementers.

According to the second-level indicator (based on parents' reports of functional limitations and other diagnosed conditions), approximately 18 percent of children, on average, ever had potential disabilities by the time of the third followup (Table III.10) As in the case of the first-level indicator, the proportion of children with a second-level indicator of a potential disability varied widely among programs, ranging from 7 to 40 percent across programs. The proportion was at least 10 percent in 14 programs. However, as before, the average incidence was similar among center-based, home-based, and mixed-approach programs and among early, later, and incomplete implementers.

The most commonly reported first-level diagnosed conditions were a diagnosed speech problem (6 percent of all children), difficulty hearing or deafness (2 percent), or difficulty seeing or blindness (2 percent). The most commonly reported second-level diagnosed conditions and functional limitations were that the child was very difficult for others to understand (9 percent of all children), a hearing problem (4 percent), difficulty communicating (3 percent), or a vision problem (3 percent).

G. FAMILY DEVELOPMENT SERVICES

The revised Head Start Program Performance Standards require programs to help families access needed family development services, either by providing them to families directly or helping families access other services available in the community. This section includes services that Early Head Start programs provided directly, as well as other community services that families reported receiving.

1. Case Management

Home visits and case management services overlapped substantially. Most of the program families who reported receiving home visits during the combined follow-up period also reported receiving case management services. Among those who reported receiving both Early Head Start home visits and Early Head Start case management, more than 90 percent reported that the person they met with for case management was the same person who visited them at home. Thus, the patterns of case management receipt are very similar to those of home visit receipt.

More than 80 percent of program families reported meeting with a case manager, and almost all of these reported more than one meeting (Table III.11). Nearly three-quarters of families reported meeting with a case manager monthly or more often during at least one follow-up period. Half reported monthly case management meetings in at least two follow-up periods, and nearly one-third reported monthly meetings continuously throughout the combined follow-up period. Families in home-based and mixed-approach programs were more likely to report monthly case management meetings in at least one follow-up period (83 and 80 percent) than center-based programs (41 percent). Families served by early implementers were more likely to receive case management than were later or incomplete implementers. As expected, these patterns of case management receipt mirror the patterns of home visiting receipt across program types and programs with different implementation patterns.

2. Family Health Care

Nearly all families (97 percent) reported that at least one family member other than the focus child received health services during the combined follow-up period (Table III.12). At least one family member in 94 percent of families visited a doctor, 77 percent visited a dentist, and 56 percent visited an emergency room. Families in home-based programs and early implementers were most likely to visit doctors and dentists; families in mixed-approach programs and early implementers were most likely to visit an emergency room.

3. Family Mental Health Care

At least one family member in nearly one-quarter of families received mental health services, including 21 percent who received treatment for an emotional or mental health problem

TABLE III.11

RECEIPT OF CASE MANAGEMENT SERVICES BY EARLY HEAD START FAMILIES, FOR THE FULL SAMPLE AND KEY PROGRAM SUBGROUPS

		Program Approach			Pattern of Implementation		
	Full Sample	Center-Based	Home-Based	Mixed-Approach	Early Implementers	Later Implementers	Incomplete Implementers
Percentage of Families Who Received:							
Any Early Head Start case management	82	66	87	88	87	78	79
More than one Early Head Start case management meeting	78	58	85	85	83	75	77
Percentage of Families Who Received Early Head Start Case Management at Least Monthly During:							
At least 1 follow-up period	72	41	83	80	76	69	71
At least 2 follow-up periods	50	21	62	55	55	41	54
Combined follow-up period	30	7	41	31	35	20	35
Percentage of Families Who Received Early Head Start Case Management at Least Weekly During:							
At least 1 follow-up period	53	20	65	62	62	46	52
At least 2 follow-up periods	31	5	43	33	37	26	29
Combined follow-up period	16	0	26	15	21	12	13
Sample Size	**1,015-1,030**	**208-209**	**473-481**	**334-340**	**348-351**	**357-365**	**310-314**

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after enrollment.

NOTE: The percentages are average percentages across programs in the given group and are weighted for survey nonresponse.

TABLE III.12

RECEIPT OF FAMILY HEALTH CARE SERVICES[a] BY EARLY HEAD START FAMILIES, FOR THE FULL SAMPLE AND KEY PROGRAM SUBGROUPS

		Program Approach			Pattern of Implementation		
	Full Sample	Center-Based	Home-Based	Mixed-Approach	Early Implementers	Later Implementers	Incomplete Implementers
Percentage of Families in Which at Least One Family Member Received Health Services	97	97	98	97	100	96	96
Percentage of Families in Which at Least One Family Member Visited:							
A doctor	94	94	95	94	98	91	94
A dentist	77	74	81	74	80	74	77
An emergency room	56	57	51	60	62	55	49
Percentage of Families in Which at Least One Family Member Received:							
Any mental health services	23	19	24	24	31	17	20
Treatment for an emotional or mental health problem	21	17	22	23	29	15	19
Drug or alcohol treatment	5	4	5	5	6	5	3
Sample Size	**1,019-1,032**	**207-211**	**476-481**	**335-340**	**349-352**	**357-365**	**311-314**

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after enrollment.

NOTE: The percentages are average percentages across programs in the given group and are weighted for survey nonresponse.

[a] Family health care services include services received by all family members except the focus child.

and 5 percent who received treatment for drug or alcohol use. Families in home-based and mixed-approach programs (24 percent) were more likely to receive mental health services than those in center-based programs (19 percent). Families in early implementers were also more likely to receive these services (31 percent), compared to later and incomplete implementers (17 and 20 percent).

4. Other Family Development Services

Families reported receiving a variety of other services either directly from Early Head Start or through referrals to other community services providers. This section describes other family development services received from both of those sources, including education-related services, help finding a job, transportation services, and housing services. Nearly two-thirds of primary caregivers reported attending a school or training program, and nearly three-quarters reported discussing education services with a case manager (Table III.13). One-third of families reported that at least one adult family member received job search assistance, and two-thirds reported that they discussed finding a job with a case manager. One-third of families reported receiving transportation services. Families in mixed approach programs (38 percent) were more likely to receive transportation services than those in home-based and center-based programs (32 and 29 percent). Nearly 60 percent of families reported receiving housing services, such as public housing, rent subsidies, help finding housing, energy assistance, or emergency housing. Families in home-based programs (66 percent) were more likely to receive housing services than those in center-based and mixed-approach programs (56 and 53 percent).

H. ENGAGEMENT IN PROGRAM SERVICES

In summer 2000, program staff rated each family's engagement with the program according to the following definitions:

TABLE III.13

RECEIPT OF FAMILY DEVELOPMENT SERVICES BY EARLY HEAD START FAMILIES, FOR THE FULL SAMPLE AND KEY PROGRAM SUBGROUPS

		Program Approach			Pattern of Implementation		
	Full Sample	Center-Based	Home-Based	Mixed-Approach	Early Implementers	Later Implementers	Incomplete Implementers
Percentage of Primary Caregivers Who:							
Attended school or a training program	62	66	55	67	63	57	65
Discussed education with a case manager	72	51	78	79	72	72	72
Percentage of Families Who:							
Received job search assistance	34	33	32	36	33	31	39
Discussed finding a job with a case manager	66	47	71	74	67	66	67
Percentage of Families Who Received Transportation Services	33	29	32	38	34	36	30
Percentage of Families Who Received:							
Any housing assistance	59	56	66	53	59	50	68
Public housing or rent subsidy	42	49	39	40	38	33	57
Help finding housing	23	19	27	21	20	24	26
Energy assistance	22	16	31	17	29	15	23
Emergency housing	4	2	5	4	5	4	2
Sample Size	**899-1,032**	**183-211**	**424-481**	**287-340**	**309-352**	**323-365**	**262-314**

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after enrollment.

NOTE: The percentages are average percentages across programs in the given group and are weighted for survey nonresponse.

- ***Consistent High Engagement:*** The family was consistently highly engaged in the program throughout its enrollment—the family kept most appointments, was actively engaged in home visits and group activities, and (when applicable) the child attended an Early Head Start child care center regularly.
- ***Variable Engagement:*** The family's engagement varied during its enrollment—the family was sometimes highly engaged in the program, and at other times, the family's engagement was low.
- ***Consistent Low Engagement:*** The family's engagement in the program was consistently low throughout its enrollment—the family kept some appointments but missed and canceled frequently, did not engage actively in home visits and group activities, and (when applicable) the child was often absent from the Early Head Start child care center.
- ***No engagement:*** The family was not engaged in the program at all.
- ***Can't remember:*** Staff could not remember how engaged the family was.

According to the engagement ratings, more than one-third of the program families were highly engaged in program services (Table III.14). Consistent with families' reports of their participation in program services, program staff reported that only seven percent of families, on average, did not become involved in the program at all. Program staff were unable to rate the engagement of six percent of program families.

The extent to which staff rated families as highly engaged varied substantially across sites, however, ranging from 20 to 74 percent (not shown). In three programs, staff reported that at least half of the families were highly engaged. Two of these were early implementers, and one was a later implementer. Two had implemented a mixed approach to service delivery, and one was center-based. Center-based programs reported the highest proportion of families who were highly engaged (47 percent), compared with home-based and mixed-approach programs (39 and 38 percent). Early, full implementation was associated with higher levels of program engagement. Early implementers reported a higher proportion of highly engaged families (44 percent), compared with later and incomplete implementers (31 and 37 percent).

TABLE III.14

PROGRAM FAMILIES' ENGAGEMENT IN EARLY HEAD START SERVICES FOR THE FULL SAMPLE AND KEY PROGRAM SUBGROUPS

		Program Approach			Pattern of Implementation		
	Full Sample	Center-Based	Home-Based	Mixed-Approach	Early Implementers	Later Implementers	Incomplete Implementers
Percentage of Families Who Were Rated As:							
Consistently highly engaged	37	47	39	38	44	31	37
Engaged at varying levels over time	32	32	29	32	29	38	27
Consistently engaged at a low level	18	7	24	20	19	17	15
Not engaged at all	7	5	8	8	8	7	7
Staff could not recall family's engagement level	6	8	10	3	1	6	14
Sample Size	**1,408**	**306**	**603**	**499**	**521**	**528**	**457**

SOURCE: Ratings of program engagement provided by program staff in Summer 2000.

NOTE: The percentages are average percentages across programs in any given group.

Several local research teams examined engagement in Early Head Start services in depth. Box III.5 describes analyses conducted by local researchers from the University of Colorado of parent and child engagement in a Montessori Early Head Start program. In Box III.6, researchers from New York University report on associations between baseline measures of parent-child interaction and parent psychological variables and families' participation in an Early Head Start center.

I. SUMMARY AND CONCLUSIONS

The 17 Early Head Start research programs succeeded in getting almost all families to participate in some program services and in core child development services. Although a large fraction of families received some services, however, less than half of the families participated intensively in program services for the full time period in which they were eligible to participate. On average, families participated in Early Head Start programs for 21 months. According to staff ratings, 37 percent were highly engaged in the program, and about one-third of families completed the program without moving away or dropping out before their eligibility ended. Across several measures of program intensity, fewer than half of program families received services at the required intensity level during at least two of the three follow-up periods. In addition, as discussed in the implementation study, programs faced challenges in delivering some services at the intensity required by the Head Start Program Performance Standards, especially weekly home visits and biweekly parent-child group socialization activities. Thus, the evaluation data confirm, as other studies of home visiting programs have found, that the goals contained in the Head Start Program Performance Standards for the duration and intensity of services are challenging to attain (Gomby 1999).

Variation in levels and intensity of service use across programs with different implementation patterns indicates that programs that achieved full implementation early were

BOX III.5

THE CHILD'S EXPERIENCE IN A MONTESSORI EARLY HEAD START PROGRAM

Jon Korfmacher, Erikson Institute, and
Paul Spicer, University of Colorado Health Sciences Center

While the literature on program evaluation has been focusing more on questions of program process, methods to explore individual variation in program response are still fairly undeveloped. In the national Early Head Start evaluation, researchers affiliated with the University of Colorado explored ways of examining this concern through the joint use of qualitative and quantitative data to better understand child and family responses to Family Star, a Montessori-based Early Head Start program in Denver, Colorado.

We used teacher ratings to capture five dimensions of child and family response to the Montessori environments of the program. These dimensions are:

1. ***Positive Classroom Engagement*:** Child orientation and attention to objects, sense of pleasure in activities, and positive social interactions with peers
2. ***Distress and Upset:*** Child crying and fussing during transition times or daily routines, such as eating, toileting, or napping
3. ***Tantrum and Fighting:*** Strongly adverse reactions when limits were set or when interacting with peers
4. ***Child Seeks Help:*** Child use of teacher for comfort, help, or company
5. ***Parent Seeks Help:*** Parent requests assistance with child's behavior or development

As qualitative work, we used ethnographic participant observation in the program classrooms and in the homes of 12 families. We used this work to develop studies of the experiences of individual children and their families with the program intervention.

The qualitative and quantitative data were combined at the level of individual cases. We examined patterns of teacher ratings for children over time and used ethnographic data to provide context and understanding of the trends noted in the ratings (in the paper presented in Volume III, data from two children are highlighted). For example, examining individual cases helped us appreciate the significance for children of the *transition* between classrooms (such as the move from the infant to the toddler classroom). The teachers and the ethnographer often observed marked decreases in the child's classroom engagement. Without information from the ethnographic work, we could not have known whether the patterns evident in teacher ratings were due to actual changes in child behavior or the biases of a new rater. Because we combined these two sources of data, we are much more confident about our interpretation of the significance of the transition for the child. Our combined data also helped us appreciate that these transitions have a significant impact on parents, because they may develop a special relationship with the staff of one classroom that is not easily transferred to the staff of a new classroom.

A multimethod approach to understanding program process is promising. Together, ethnographic and quantitative report data can tell more-complete stories about children's experiences of the intervention than could a single method.

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BOX III.6

PREDICTORS OF PROGRAM PARTICIPATION AT THE EDUCATIONAL ALLIANCE'S EARLY HEAD START

Mark Spellmann, Ph.D., Catherine Tamis-LeMonda, Ph.D., Maria Yarolin, Lisa Baumwell, Ph.D.,
Joanne Roberts, Ph.D., and the NYU Early Childhood Research Team
New York University

Do parent characteristics predict participation in the Early Head Start program? To explore this question, we tested baseline measures of parent-child interaction and parent psychosocial variables as predictors of Early Head Start program participation. We gathered baseline data when children were 6 months old. Program participation was defined as child attendance at the Educational Alliance's Early Head Start child care centers and parent involvement with Early Head Start social service staff.

Three categories of baseline measures predicted lower levels of children's attendance at the Early Head Start centers:

1) Exposure to domestic and community violence (this included domestic violence suffered in the past year, awareness of domestic violence toward others, and experience of community violence within the past five years)
2) Lack of father involvement
3) Harsh rejection of Early Head Start mothers by their own fathers while growing up

Parent involvement with Early Head Start social service staff was predicted by:

1) Exposure to domestic and community violence
2) Father involvement
3) Maternal efficacy
4) Modern (versus traditional) cultural child-rearing values

Observational ratings of quality of parenting, quality of parent-infant interaction, and parent mental health did not predict attendance or involvement.

Of the wide range of variables tested as potential predictors of program participation, few tapped father involvement. Yet factors associated with fathering dominated the array of significant predictors. Positive factors—"social support mothers received from babies' fathers," "living with partner/husband," and "baby's father was a caretaker"—promoted program participation. Harsh, rejecting fathers in mothers' families when they were growing up and domestic violence were negative predictors of participation.

The finding that higher maternal efficacy predicted involvement with family social service staff suggests that more confident mothers were more able to open up to social service staff. The finding on cultural child-rearing values suggests that a match of mother-staff values was important for involvement.

These findings suggest that Early Head Start programs should carefully look at the reasons for a family's withdrawal or failure to engage. When families withdraw because the child-rearing values of the program and of the family are not a good fit, programs may question whether they are sufficiently inviting and inclusive toward all segments of the communities they serve.

When a family withdraws from an Early Head Start program because of a lack of father involvement, Early Head Start programs might see this as an indication that families new to Early Head Start may need extra attention and support if they are to maintain attendance and involvement.

Exposure to violence is the most serious reason (of those found in this study) for a family to withdraw from Early Head Start. Children and families in these situations are clearly at high risk. Early Head Start programs cannot always know whether domestic or community violence plays a role in a family's withdrawal. However, Early Head Start staff members could ask themselves whether any warning signs of violence were evident when families withdrew. Further research is needed to explore the magnitude of this problem and, if necessary, to increase Early Head Start staff awareness of its dimensions.

more successful in gaining families' participation in services. Early implementers consistently provided services to a larger fraction of the families in their caseloads, and they consistently provided intensive services to a larger fraction of families.

Levels of participation and intensity of service use also varied across program approaches, usually in expected ways. For example, families enrolled in center-based programs were most likely to use Early Head Start center care and used more hours of center-based care. Likewise, families in home-based programs were most likely to participate in frequent home visits, case management meetings, and parent-child group socialization activities. Levels of participation among families in mixed-approach programs usually fell between the levels reported by families in center-based and those in home-based programs. The duration of participation, however, was longest in mixed-approach programs.

Thus, while fewer than half of program families were involved intensively in the Early Head Start programs for the full period of time in which they were eligible to receive services, almost all families received some services, and the majority received fairly intensive services during at least one of the three follow-up periods. In the next chapter, we examine the extent to which program families' levels of service use and the intensity of services they received were greater than what they would have received in the absence of Early Head Start.

IV. EARLY HEAD START IMPACTS ON SERVICE RECEIPT

In Chapter III, we described services families received; here we compare services received by program and control group families. Although control group families could not receive Early Head Start services, they were free to seek other similar services in their communities. If most control group families received similar services, and if these services were as intensive as the services received by Early Head Start families, we might find few significant impacts on child and family outcomes, even if the Early Head Start research programs were highly successful in achieving their desired outcomes. Thus, for understanding program impacts on child and family outcomes, it is important to examine the differences in service receipt between program and control group families.

Our analysis of Early Head Start programs' impacts on service receipt shows that, even though many control group families received some similar services from other community service providers, program families were much more likely to receive key child development and case management services during the combined follow-up period (28 months after program enrollment, on average). Early Head Start programs' impacts on service receipt were large and statistically significant in most of the service areas we examined. The pattern of impacts on service receipt was generally similar to the pattern reported when families had been in the program for 16 months, on average.[1]

This chapter presents our analyses of program impacts on families' service receipt. The first section describes global impacts of the Early Head Start programs on service receipt and service intensity during 28 months, on average, after random assignment.[2] The second section summarizes the variations in these impacts among key subgroups of programs. The final section discusses the implications of these analyses for the analyses of impacts on children and families.

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[1] See *Building Their Futures: How Early Head Start Programs Are Enhancing the Lives of Infants and Toddlers in Low-Income Families* (Administration on Children, Youth and Families 2001) for more details about these interim impacts on service receipt.

A. GLOBAL IMPACTS ON SERVICE RECEIPT AND SERVICE INTENSITY

Early Head Start program families were significantly more likely than control families to receive any key services (home visits, case management, center-based child care, and group parenting activities) during the combined follow-up period. The Early Head Start programs increased receipt of any key services by 14 percentage points (from 82 to 96 percent). While Early Head Start significantly increased services to program families, most control families received some services from other providers in the community.

The following subsections describe the global impacts of Early Head Start programs on families' receipt of specific services, including any core child development services (home visits or center-based care), home visits, child care, parenting education and parent-child group socialization activities, child health services, services for children with disabilities, case management, family health services, and family development services.

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[2] To analyze the Early Head Start programs' impacts on service receipt and service intensity, we drew primarily on data from the Parent Services Follow-Up Interviews. These interviews were targeted for 6, 15, and 26 months after program enrollment and completed an average of 7, 16, and 28 months after enrollment. As described in Chapter III, we report primarily on cumulative levels of service use across all three follow-up periods. We use the term "combined follow-up period" to refer to cumulative levels of service receipt derived from the three waves of the parent services follow-up interviews. We also report some cumulative levels of service receipt and intensity that occurred in at least one or two of the three follow-up periods. Occasional deviations from the use of these terms are explained in the text.

1. Impacts on the Receipt of Core Child Development Services

As described in Chapter III, Early Head Start programs provided child development services primarily through home visits and child care in Early Head Start centers. The Early Head Start programs' impact on receipt of these core child development services was large and statistically significant. Nearly all program families received at least minimal core services (93 percent), compared with 58 percent of control families (Figure IV.1).[3] While almost all program families received more than minimal core services (more than one home visit or at least two weeks of center-based child care), only half of control families received more than minimal core services.

The programs' impact on receipt of core child development services was larger when service intensity is taken into account. Program families were substantially more likely than control families to have received core child development services at the intensity required by the revised Head Start Program Performance Standards (weekly home visits, at least 20 hours a week of center-based child care, or a combination of the two). Nearly three-quarters of program families received the required intensity of services during at least one of the three follow-up periods, and half received them during at least two follow-up periods. Among control families, however, only 14 percent received core services at the required intensity during at least one follow-up period, and only 7 percent received them during at least two follow-up periods.

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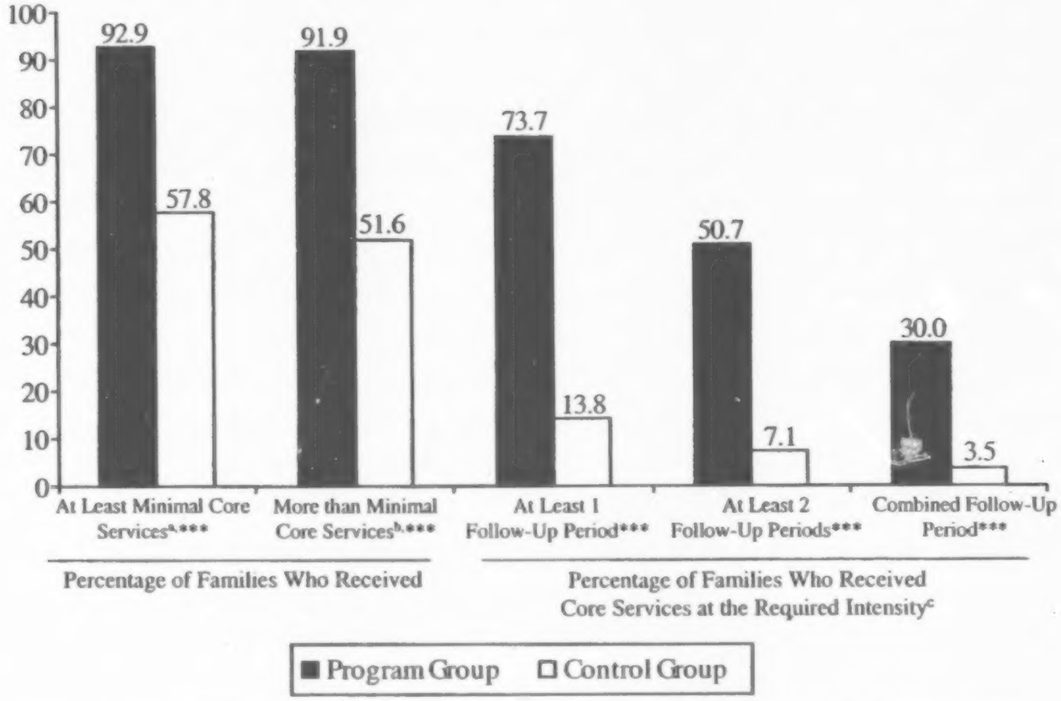
[3] The percentage of program families who received core child development services is slightly larger in Figure IV.1 than in Table III.2, because Table III.2 includes only home visits and center-based child care provided directly by the Early Head Start programs. Figure IV.1 includes home visits and center-based child care received from any source for both the program and control groups. A small percentage of Early Head Start families also received core child development services from community service providers.

FIGURE IV.1

IMPACTS ON RECEIPT OF CORE CHILD DEVELOPMENT SERVICES
DURING THE COMBINED FOLLOW-UP PERIOD



Source: Parent Services Follow-Up Interviews conducted approximately 7, 16, and 28 months after random assignment.

Note: All percentages are regression-adjusted means estimated using models that weight each site equally. The differences between program and control families are estimated impacts per eligible applicant. The percentage of program families who received core child development services is slightly larger than in Table III.3, because that table includes only home visits and center-based child care provided directly by the Early Head Start programs. Because some control families received these services from other community providers, the percentages here include home visits and center-based child care received from any source. A small percentage of program families also received these services from other community providers.

[a] At least one home visit and/or center-based child care.

[b] More than one home visit and/or at least two weeks of center-based child care.

[c] Weekly home visits for home-based sites, at least 20 hours per week of center-based child care for center-based sites, and weekly home visits or at least 20 hours per week of center-based child care for mixed-approach sites.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

a. Impacts on Receipt of Home Visits

As described in Chapter III, all Early Head Start programs are expected to visit families at home on a regular basis. Home-based programs are expected to visit families weekly, and center-based programs must visit families at least twice a year. Mixed-approach programs are expected to provide families with weekly home visits, center-based child care, or a combination of the two.

The Early Head Start programs had large impacts on families' receipt of home visits. During the combined follow-up period, 87 percent of program families received at least one home visit, compared with 34 percent of control families (Figure IV.2).[4] Not only were program families much more likely to have received any home visits, they were also much more likely to have received home visits at least monthly. Nearly three-quarters of program families received home visits at least monthly during at least one follow-up period, compared with 15 percent of control families. Likewise, very few control families received home visits at least weekly during at least one follow-up period, while more than half of program families received home visits at least weekly during at least one follow-up period. Nearly all families in both groups who received home visits reported that they received child development services during the visits. Thus, the Early Head Start programs' impacts on receipt of home visits are similar to impacts on receipt of child development services during home visits.

Based on the frequency of home visits families reported receiving during each of the three waves of follow-up interviews, we estimated that program families received roughly 56 home visits, on average, during the 26 months after program enrollment, while control families

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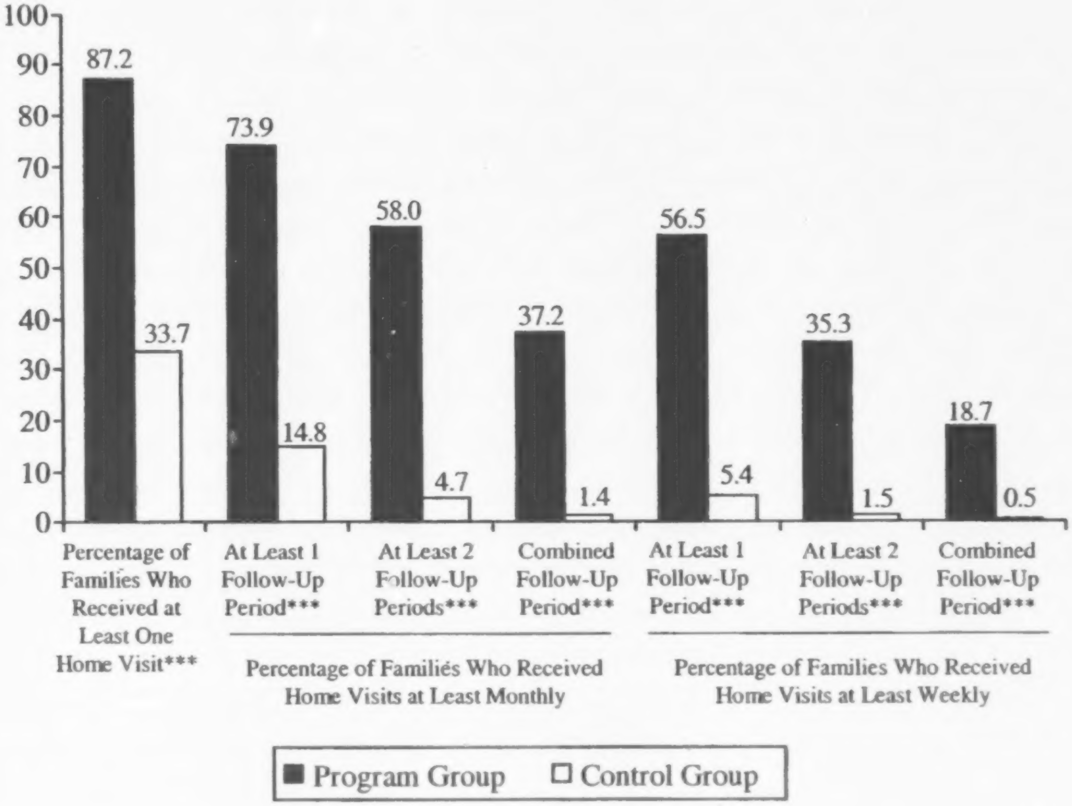
[4] The percentage of program families who received home visits is slightly larger in Figure IV.2 than in Table III.3, because Table III.3 includes only home visits provided directly by the Early Head Start program. Figure IV.2 includes home visits received from any source for both the program and control groups. A small percentage of program families also received home visits from other community service providers.

FIGURE IV.2

IMPACTS ON RECEIPT OF HOME VISITS DURING THE COMBINED FOLLOW-UP PERIOD



Source: Parent Services Follow-Up Interviews conducted approximately 7, 16, and 28 months after random assignment.

Note: All percentages are regression-adjusted means estimated using models that weight each site equally. The differences between program and control families are estimated impacts per eligible applicant. The percentage of program families who received home visits is slightly larger than in Table III.4, because that table includes only home visited provided directly by the Early Head Start programs. Because some control families received home visits from other community providers, the percentages reported here include home visits received from any source. A small percentage of program families also received home visits from other community providers.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

received an average of six visits (not shown).[5] Thus, while a third of control families received some home visits, program families received many more visits, on average. Although these estimates are useful for providing a rough sense of the number of home visits families typically received, caution should be used interpreting their precision. As described in Chapter III, these estimates are based on families' reports of the typical home visit frequency during the relevant follow-up period, not on their reports of numbers of home visits or program records on the date of each home visit.

b. Impacts on Receipt of Child Care Services

The Early Head Start programs significantly increased families' use of child care. Most families in both groups used some child care during their first 26 months after random assignment, but program children were significantly more likely than control children to have received some child care—86 compared to 80 percent (Figure IV.3).[6] The programs increased families' use of center-based child care more substantially. Half of program families used center-based child care during their first 26 months after random assignment, compared with 36 percent of control families.

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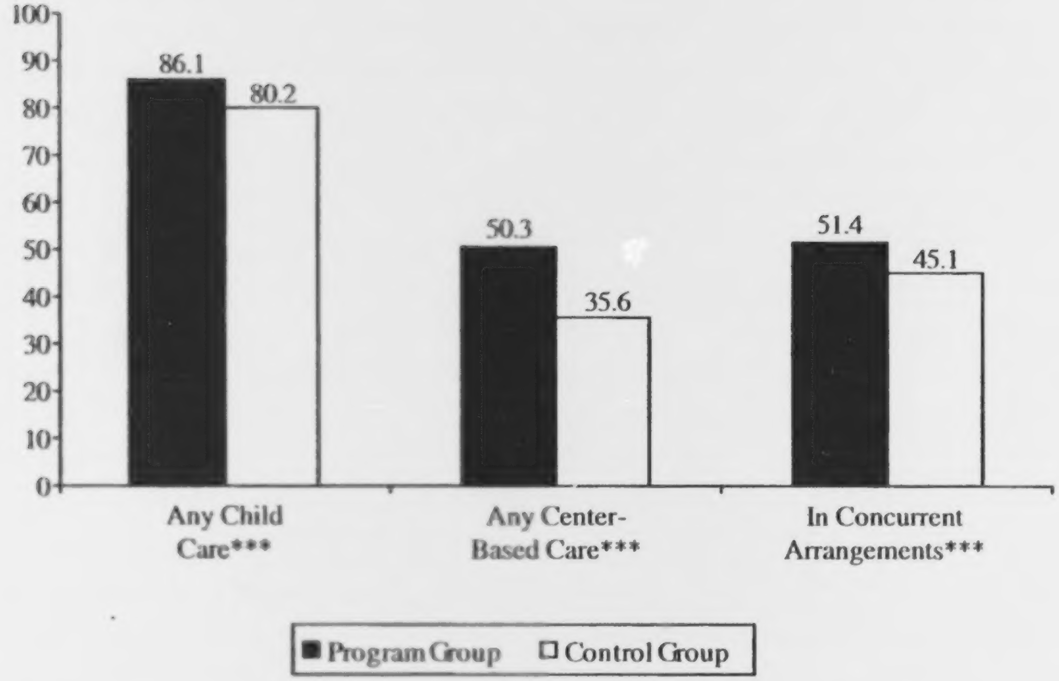
[5] We calculated this estimate by adding together the estimated number of home visits received during each of the three follow-up periods and then prorating the estimate to 26 months after random assignment (by multiplying the estimated number of home visits by 26 divided by the actual length of the combined follow-up period). Estimates for each follow-up period were derived by multiplying the estimated number of home visits per unit of time based on the reported frequency of home visits by the length of the follow-up period in the same units of time.

[6] Because the parent services follow-up interviews collected detailed information on families' use of child care services, including dates of arrangements, we constructed a 26-month timeline that contains information on all the child care arrangements reported during the three waves of parent services follow-up interviews. Summary measures of child care use were developed using the timeline. Thus, the follow-up period for child care services is 26 months (the period covered for nearly all families who completed the interviews) for all families unless otherwise noted.

FIGURE IV.3

IMPACTS ON RECEIPT OF CHILD CARE DURING THE 26-MONTH FOLLOW-UP PERIOD



Source: Parent Services Follow-Up Interviews conducted approximately 7, 16, and 28 months after random assignment.

Note: All percentages are regression-adjusted means estimated using models that weight each site equally. The differences between program and control families are estimated impacts per eligible applicant.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

Program families were significantly more likely than control families to use concurrent child care arrangements (more than one child care arrangement at a time). Program families may have had a greater need for multiple arrangements to cover all the hours during which they needed child care because they used significantly more center-based care than control families. Centers may have been less likely than some other providers, such as relatives or family child care providers, to offer care during nonstandard work hours such as evenings and weekends.

Not only did the Early Head Start programs increase the percentage of families using any child care, they also increased the amount of child care that children received (Figure IV.4). Program children received significantly more hours of child care than control children during the 26 months after enrollment (1,544 compared to 1,224 hours, on average) and significantly more hours of center-based child care (687 compared to 357 hours, on average) during the 26 months after random assignment.[7]

Program families paid significantly less money out of pocket for child care, on average, than control families. Program families paid $326 less for child care, on average, during the 26 months following enrollment—nearly a 40 percent reduction in out-of-pocket child care costs (Table IV.1). Some of the Early Head Start programs provided child care to some or all families free of charge. Others helped families make child care arrangements with other community providers and paid some or all of the cost of care. Early Head Start programs, however, did not significantly affect the percentage of families who reported obtaining individual subsidies or vouchers to pay for child care during the 26 months after random assignment.[8]

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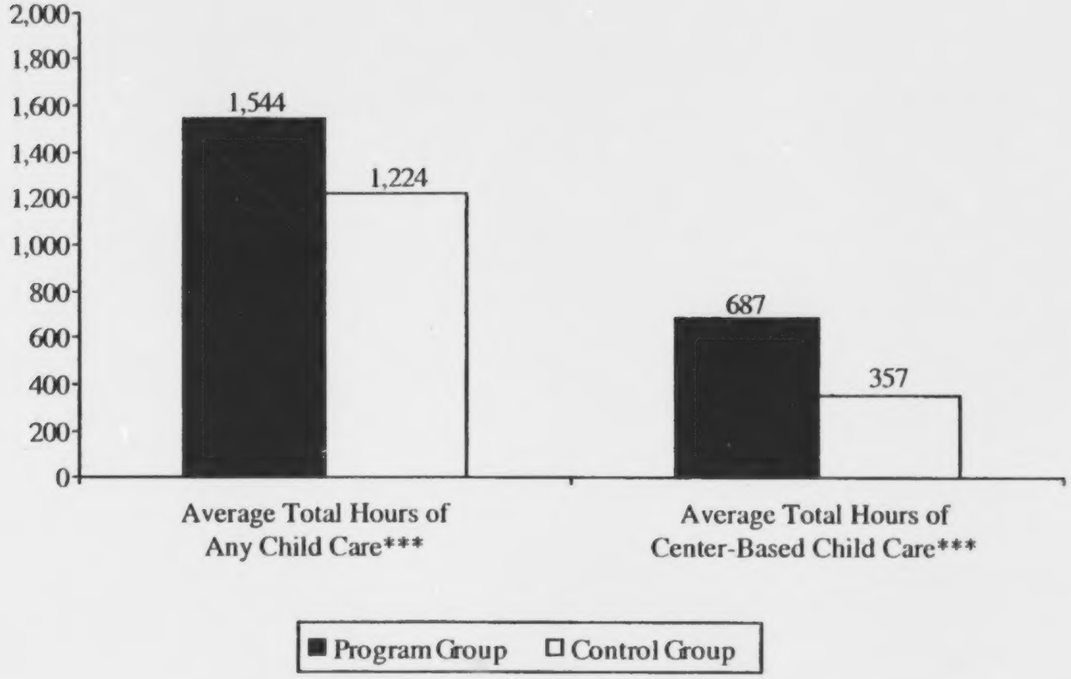
[7] These averages include families who did not use any child care.

[8] On follow-up surveys, parents were asked if they received a special check or voucher to pay for each child care arrangement. Thus, the percentages reported here include child care subsidies that parents received in the form of vouchers, but do not include subsidized child care provided through slots contracted directly by the state or free care provided by Early Head Start or other sources.

FIGURE IV.4

IMPACTS ON HOURS OF CHILD CARE USED DURING THE 26-MONTH FOLLOW-UP PERIOD



Source: Parent Services Follow-Up Interviews conducted approximately 7, 16, and 28 months after random assignment.

Note: All percentages are regression-adjusted means estimated using models that weight each site equally. The differences between program and control families are estimated impacts per eligible applicant.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE IV.1

IMPACTS ON OUT-OF-POCKET CHILD CARE COSTS AND USE OF CHILD CARE SUBSIDIES DURING THE 26-MONTH FOLLOW-UP PERIOD

	Program Group	Control Group	Estimated Impact per Eligible Applicant
Average Total Out-Of-Pocket Child Care Costs	$490	$816	-$326***
Percentage of Families Who Ever Received a Child Care Subsidy for:			
Any child care arrangement	29.6	32.1	-2.5
A center-based child care arrangement	16.7	16.6	0.1

SOURCE: Parent Services Follow-Up Interviews conducted approximately 7, 16, and 28 months after random assignment.

NOTE: All percentages are regression-adjusted means estimated using models that weight each site equally. The differences between program and control families are estimated impacts per eligible applicant.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

2. Impacts on Receipt of Other Child Development Services

In addition to home visits and center-based child care, Early Head Start programs provided a range of other child development services. In this section, we report impacts on receipt of parenting education and parent-child group socialization services, child health services, and services for children with disabilities.

a. Impacts on Receipt of Parenting Education and Parent-Child Group Socializations

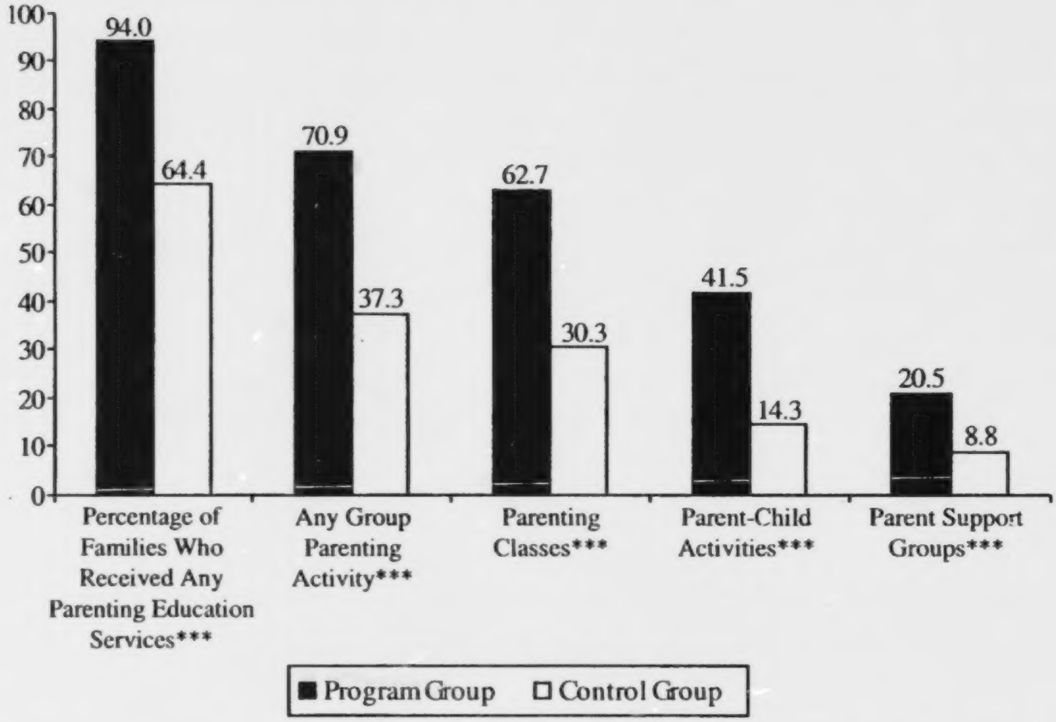
The Early Head Start programs significantly increased the likelihood that families received parenting education services, including discussions with case managers about parenting and group parenting activities. Nearly all program families (94 percent) received some parenting education, compared with 64 percent of control families (Figure IV.5).

Although the Early Head Start programs found it very challenging to achieve high participation rates in group parenting activities (parenting classes, parent-child group socialization activities, and parent support groups), they significantly increased program families' participation in these services relative to control families' participation in similar activities in the community. Seventy-one percent of program families participated in a group parenting activity during the combined follow-up period, compared to 37 percent of control families. The impact of the program on participation in parent-child group socialization activities was also substantial. Forty-two percent of program families participated in these activities during the combined follow-up period, compared with only 14 percent of control families.

In 12 of the Early Head Start research sites, when children were approximately 3 years old, interviews were conducted with fathers about their receipt of child development services. Box IV.1 summarizes the impacts the program had on fathers' receipt of child development services.

FIGURE IV.5

IMPACTS ON RECEIPT OF PARENTING EDUCATION SERVICES DURING THE COMBINED FOLLOW-UP PERIOD



Source: Parent Services Follow-Up Interviews conducted approximately 7, 16, and 28 months after random assignment.

Note: All percentages are regression-adjusted means estimated using models that weight each site equally. The differences between program and control families are estimated impacts per eligible applicant.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

BOX IV.1

FATHER PARTICIPATION IN PROGRAM-RELATED ACTIVITIES

Early Head Start programs have increasingly devoted energies to involving men in program activities, and also to encouraging biological fathers and father figures to be more active participants with their children and families. The Early Head Start father studies began at a time when the majority of the research programs had not implemented specific father involvement components and did not target father outcomes as areas of expected change. Direct assessment of fathers and father outcomes were not included in the original evaluation design, but Father Studies were added to the research to provide descriptive information about the role of fathers or father figures (social fathers) in the lives of their children and to explore how father involvement in children's lives is related to child outcomes. Here we describe father participation in program-related activities.

Data about fathers' participation in program-related activities were collected from fathers in the 12 father study sites. As described in Chapter 2, our findings about fathers are drawn from father interviews conducted when the children were approximately 36 months old. The father study samples, measures, and constructed variables are described in Appendix C.

Early Head Start programs affected fathers' program participation in important ways. In interviews with fathers, we asked about their participation in five types of activities: home visits, dropping off/picking up child at a child development or child care center, attending parenting classes or events, attending parent-child activities, and attending meetings or events just for fathers.[1]

- Significantly more fathers and father figures of Early Head Start children participated in four of these five program-related activities than fathers/father figures of control-group children did. Early Head Start fathers and father figures were more likely to have participated in a home visit, parenting classes or events, group parent-child activities, and meetings or events for fathers than control-group fathers/father figures were (see table, next page).
- We also asked about the frequency with which fathers participated in selected activities: home visits once per month or more, dropping off/picking up child from center 10 times or more in the past month, and the remaining activities three times or more in the response period. For all activities except meetings or events for fathers, a significantly higher proportion of Early Head Start fathers participated in individual activities more frequently than controls.
- As expected, given that programs were at early stages in their efforts to engage fathers, overall rates of Early Head Start father participation were less than 50 percent for individual activities. Although we see differences between fathers in the two groups, the majority of fathers and father figures of program children did not report participating in these activities, but a small proportion participated at higher levels.

Patterns of father participation varied only slightly by program approach. Regardless of program approach, more fathers and father figures of Early Head Start children reported participating in home visits than control-group fathers/father figures did. There were no differences by program approach for dropping off and picking up the child from a child development program or center (see Box IV.1, Figure 1). Center-based and home-based programs affected father attendance at parenting classes or activities and participation in parent-child activities, but mixed-approach programs did not.

Overall program implementation was related to father participation in program-related activities. Overall program implementation (especially among sites reaching full implementation later) increased father and father figure participation in most (but not all) program-related activities (see Box IV.1, Figure 2). Programs may be able to engage more fathers and engage them more frequently if they implement the performance standards and consider the unique needs of their fathers and father figures, along with existing barriers to their involvement in the context of overall family partnerships.

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[1] The 12 father interview study sites included all 4 center-based programs, 5 of the home-based programs, and 3 mixed-approach programs. The pattern of implementation across the 12 sites included 5 sites in the early group, 4 sites in the later group, and 3 sites in the incomplete group.

BOX IV.1, TABLE 1

GROUP DIFFERENCES IN FATHER PROGRAM-RELATED ACTIVITIES
(Percentages)

	Program Group	Control Group	Estimated Impact per Eligible Applicant[a]
Ever Engaged in Activity			
Home Visit	33.7	4.5	29.1***
Dropped Off/Picked up Child from a Child Development/Child Care Center	45.4	40.7	4.7
Parenting Classes or Events	25.0	11.4	13.6***
Parent-Child Activities	20.1	8.4	11.7***
Meetings or Events Just for Fathers	9.6	5.9	3.7*
Engaged above Threshold in Activity			
Home Visit Once per Month or More	22.6	1.3	21.3***
Dropped Off/Picked up Child from a Child Development/Child Care Center 10 or More Times	11.0	1.7	9.3***
Parenting Classes or Events Three or More Times	16.2	8.3	7.9***
Parent-Child Activities Three or More Times	9.9	4.0	5.9***
Meetings or Events Just for Fathers Three or More Times	4.4	2.6	1.8
Sample Size	**326**	**311**	**637**

SOURCE: Father interviews conducted in the father study sites when children were approximately 36 months old.

NOTE: All impact estimates were calculated using regression models, where data were pooled across sites.

[a] The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for all program and control group members.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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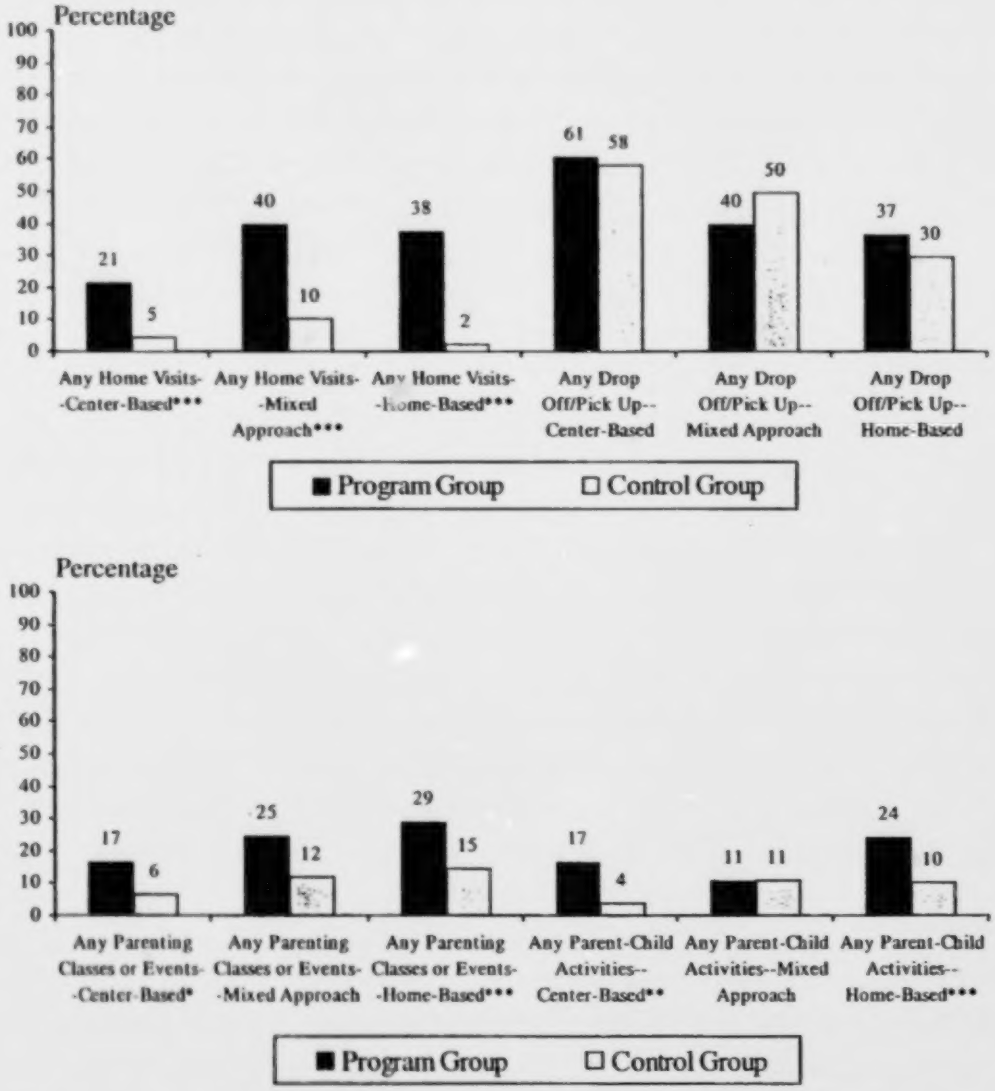
BOX IV.1, FIGURE 1

SELECTED GROUP DIFFERENCES IN FATHER PROGRAM-RELATED ACTIVITIES BY INITIAL PROGRAM APPROACH



Source: Father interviews conducted in the 12 father study sites when the children were approximately 36 months old.

Notes: All percentages are regression-adjusted means estimated using models that pool across site. The differences between program and control families are estimated impacts per eligible applicant.

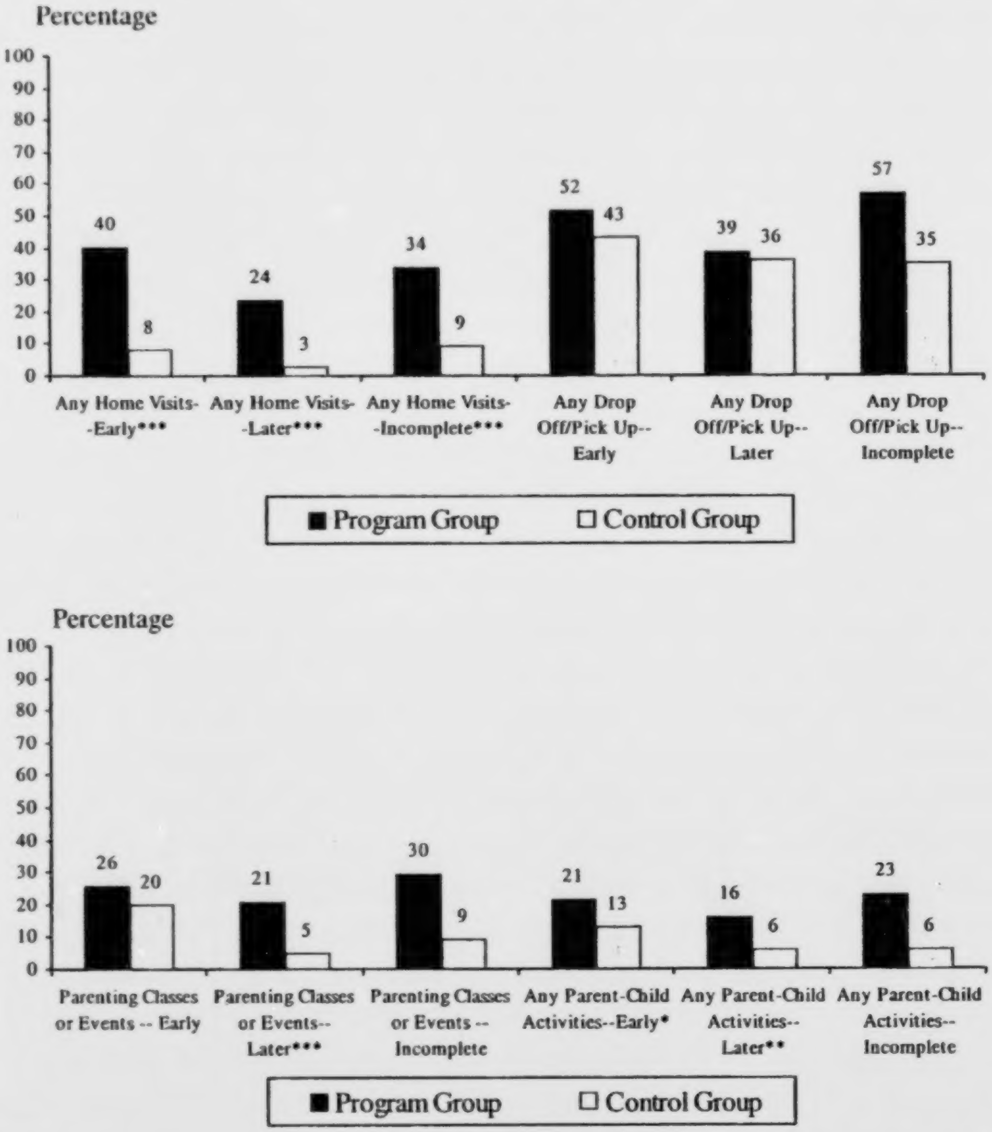
* Program impact is significantly different from zero at the .10 level, two-tailed test.

** Program impact is significantly different from zero at the .05 level, two-tailed test.

***Program impact is significantly different from zero at the .01 level, two-tailed test.

BOX IV.1, FIGURE 2

SELECTED GROUP DIFFERENCES IN FATHER PROGRAM-RELATED ACTIVITIES BY PATTERN OF IMPLEMENTATION



Source: Father interviews conducted in the 12 father study sites when the children were approximately 36 months old.

Notes: All percentages are regression-adjusted means estimated using models that pool across site. The differences between program and control families are estimated impacts per eligible applicant.

* Program impact is significantly different from zero at the .10 level, two-tailed test.
** Program impact is significantly different from zero at the .05 level, two-tailed test.
***Program impact is significantly different from zero at the .01 level, two-tailed test.

b. Impacts on Receipt of Child Health Services and Child Health Status

All children in both groups received some health services during the combined follow-up period, which reflects the accessibility of health services afforded by Medicaid and State Children's Health Insurance Programs (Table IV.2). It also reflects the fact that many of the Early Head Start research programs recruited families at health clinics or WIC offices, where families were linked to health services before applying to Early Head Start. Few impacts on receipt of specific child health services were statistically significant during the combined follow-up period, because most families in both groups received services. Likewise, parents' reports of the health status of their children when they were 3 suggest no statistically significant differences in the health status of program and control children.

Nevertheless, the Early Head Start programs increased children's receipt of a few health services. Early Head Start programs had small but statistically significant impacts on the percentage of children who visited a doctor for treatment of illness (83 compared to 80 percent) and on the percentage of children who received immunizations (99 compared to 98 percent) during the combined follow-up period. The programs had a larger, negative impact on the likelihood of hospitalization for an accident or injury in the child's third year (0.4 compared to 1.6 percent).

c. Impacts on Receipt of Services for Children with Disabilities

The Early Head Start programs had a pattern of small, significant impacts on eligibility for and receipt of early intervention services, as well as on the incidence of disability indicators. The programs increased the percentage of children who were ever identified by their parents as eligible for early intervention services (7 compared with 6 percent) during the combined follow-up period (Figure IV.6). The percentage of children who, according to parents, ever received

TABLE IV.2

IMPACTS ON RECEIPT OF CHILD HEALTH SERVICES AND CHILD HEALTH OUTCOMES DURING THE COMBINED FOLLOW-UP PERIOD

Outcome	Program Group	Control Group	Estimated Impact per Eligible Applicant
Average Percentage of Children Who Received Any Health Services	100.0	99.8	0.2
Percentage of Children Who Visited a Doctor:			
For any reason	98.9	98.4	0.5
For a check-up	95.0	95.1	-0.1
For treatment of an acute or chronic illness	82.9	80.2	2.8*
Average Number of Doctor Visits:			
For check-ups	6.6	6.3	0.3
For treatment of an acute or chronic illness	6.2	5.8	0.4
Percentage of Children Who Visited An Emergency Room	54.0	53.5	0.5
Average Number of Emergency Room Visits:			
For any reason	1.6	1.8	-0.2
For treatment due to accident or injury	0.1	0.1	0.0
Average Number of Hospitalizations During Child's Third Year	0.1	0.1	0.0
Average Number of Nights Hospitalized During Child's Third Year	0.3	0.5	-0.3
Child Ever Hospitalized in Third Year for Accident or Injury	0.4	1.6	-1.3***
Average Percentage of Children Who:			
Visited a dentist	28.3	26.2	2.1
Received immunizations	98.8	97.8	1.1*
Average Percentage of Children Who Received:			
Any screening test	66.8	66.5	0.2
A hearing test	40.2	40.1	0.1
A lead test	28.4	30.5	-2.2
Average Parent-Reported Health Status of Child at 36 Months[a]	4.0	4.0	0.0
Percentage of Children Who Were Reported by Parents To Be in Fair or Poor Health at 36 Months	8.2	8.7	-0.5
Sample Size	**966-1,104**	**915-1,010**	**1,966-2,106**

TABLE IV.2 (*continued*)

SOURCE: Parent Services Follow-Up Interviews conducted approximately 7, 16, and 28 months after random assignment.

NOTE: All percentages are regression-adjusted means estimated using models that weight each site equally. The differences between program and control families are estimated impacts per eligible applicant.

[a]Primary caregivers rated their children's health status on a scale of 1 (poor) to 5 (excellent).

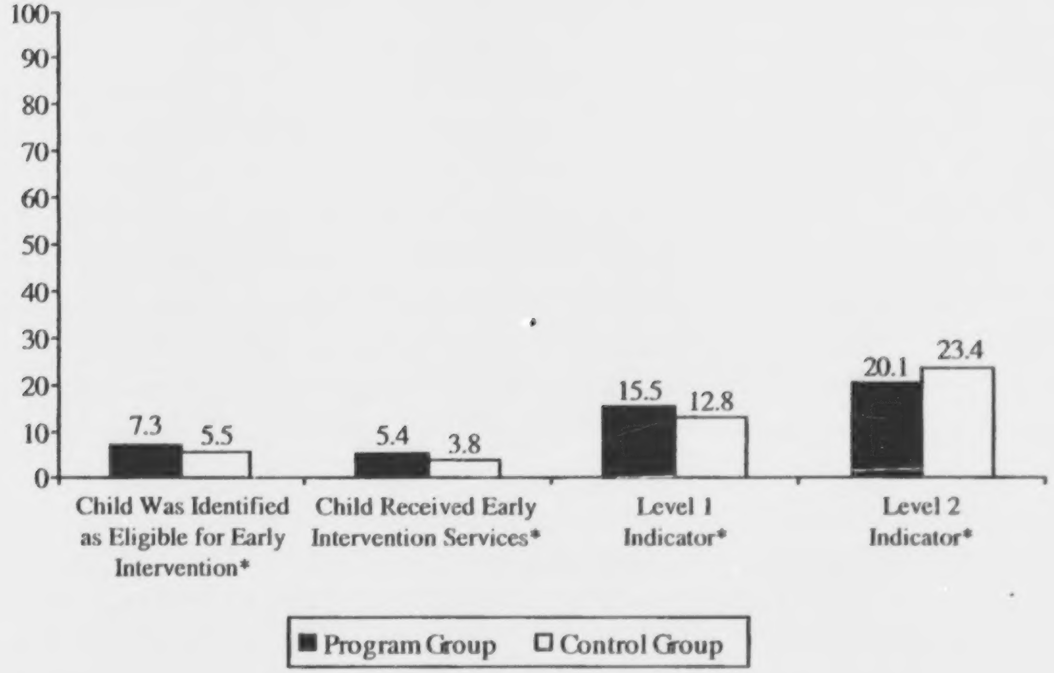
*Significantly different from zero at the .10 level, two-tailed test

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

FIGURE IV.6

IMPACTS ON EARLY INTERVENTION SERVICES DURING THE COMBINED FOLLOW-UP PERIOD



Source: Parent Services Follow-Up Interviews conducted approximately 7, 16, and 28 months after random assignment.

Note: All percentages are regression-adjusted means estimated using models that weight each site equally. The differences between program and control families are estimated impacts per eligible applicant. Level 1 diagnosed conditions indicate eligibility for early intervention services and include a diagnosed hearing problem, severe or profound hearing loss, difficulty hearing or deafness, vision problem, difficulty seeing or blindness, speech problem, mobility problem, mental retardation, emotional disturbance, cleft palate, or a serious condition that showed up at birth or soon after, such as Down Syndrome, Turner's Syndrome, or spina bifida. Level 2 diagnosed conditions, which may indicate eligibility for early intervention services, include crossed eyes or nearsightedness, epilepsy or seizures, hyperactivity, or a developmental delay. Functional limitations include possible hearing and vision problems, communication problems, trouble with arm/hand or leg/foot, and use of special equipment to get around.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

early intervention services was also slightly higher among program families (5 compared with 4 percent).

Based on parents' reports, the extent of eligibility for early intervention services (reported eligibility or incidence of first-level diagnosed conditions) was also greater among program families (16 compared with 13 percent by the third followup). This increase probably reflects greater awareness or willingness among program families to report eligibility for early intervention services or diagnosed conditions or a higher likelihood among program children that conditions were diagnosed, but it could also reflect a higher incidence of the conditions among program children.

In contrast, the incidence of functional limitations or second-level diagnosed conditions reported by parents was smaller among program families (20 compared with 23 percent). This may reflect differences in program parents' perceptions of functional limitations, differences in actual functional limitations due to help the program provided to families in obtaining health care to address the limitations, or differences in children's development brought about by the Early Head Start programs.

Through a series of case studies, the local research team at Catholic University examined Early Head Start's role in supporting families in obtaining services for young children with disabilities. These case studies are summarized in Box IV.2.

3. Impacts on Receipt of Family Development Services

Early Head Start programs helped families access a range of family development services, either by providing them directly or through referral to other community service providers, and significantly increased families' receipt of many services. The following subsections describe the programs' impacts on receipt of case management, health care, education-related services, employment-related services, transportation, and housing services.

BOX IV.2

EARLY HEAD START SUPPORTS FAMILIES IN OBTAINING SERVICES FOR YOUNG CHILDREN WITH DISABILITIES

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Michaela Z. Farber, and Elizabeth M. Timberlake
Catholic University of America

Although young children in low-income families face a higher risk of delays and disabilities, these families are less likely to obtain early intervention services than are more affluent ones. We conducted two studies to (1) determine whether Early Head Start enhances the likelihood that low-income families will obtain early intervention services when needed, and (2) identify how Early Head Start collaborates with families toward that goal.

The first study used case studies of 32 research families with children suspected of needing early intervention to investigate whether Early Head Start facilitates referral, identification, and early intervention service provision. The families lived in a poor section of a generally affluent, densely and diversely populated, suburban area. Suspected need was defined as a recommendation by medical or community providers, Early Head Start staff, or researchers (as part of notification of low Bayley scores) that parents contact early intervention services. The case studies used in-depth interviews of mothers and staff members and a review of program and research records. A larger number of Early Head Start families were notified of a suspected need to refer (19, versus 13 in the control group), probably because Early Head Start staff members working with their children thought it necessary (see Table 1 in Volume III). With the active encouragement of Early Head Start staff, 18 of 19 (94 percent) Early Head Start families followed through to make the referral to the Part C or Part B office, compared with only 7 of 13 (54 percent) control families. A greater proportion of Early Head Start children were evaluated (89 versus 46 percent) and found eligible for services (79 versus 31 percent). The Early Head Start children represented a wider range of types of disabilities and severity levels, which suggests that Early Head Start programs may empower families to notice their children's developmental challenges and obtain services, not only for medically related disabilities, but also for developmental delays.

In the second study, researchers analyzed four case studies to determine how Early Head Start service providers supported families in obtaining early intervention services. As Early Head Start staff members began to work with the focus child, they earned trust and established relationships with the parents by helping with problem solving and resource identification to address basic family needs. Early Head Start workers were then able to help parents focus on the less familiar challenges central to their children's development. In very different ways, according to parents' abilities and emotions, Early Head Start staff helped parents understand child development, recognize and accept their children's unique challenges, comprehend that early intervention services might have something to offer, and learn how to navigate the complex early intervention system.

a. Impacts on Receipt of Case Management

Program families were significantly more likely than control families to receive case management services during the combined follow-up period—87 percent compared with 55 percent (Figure IV.7). Program impacts on the receipt of case management services at least monthly were large and similar to the impacts on receipt of home visits at least monthly. As was the case for home visits, approximately one-fourth of control families met with a case manager at least monthly during at least one follow-up period, compared with more than three-quarters of program families.

b. Impacts on Receipt of Family Health Care Services and Primary Caregiver's Health Status

Nearly all program and control families reported that at least one family member (excluding the focus child) received some health services during the combined follow-up period (97 and 98 percent, respectively, received health services), and the program impact was not significant (Table IV.3). Likewise, we found no statistically significant impact on primary caregivers' self-reported health status when their children were 3 years old.

c. Impacts on Receipt of Family Mental Health Services

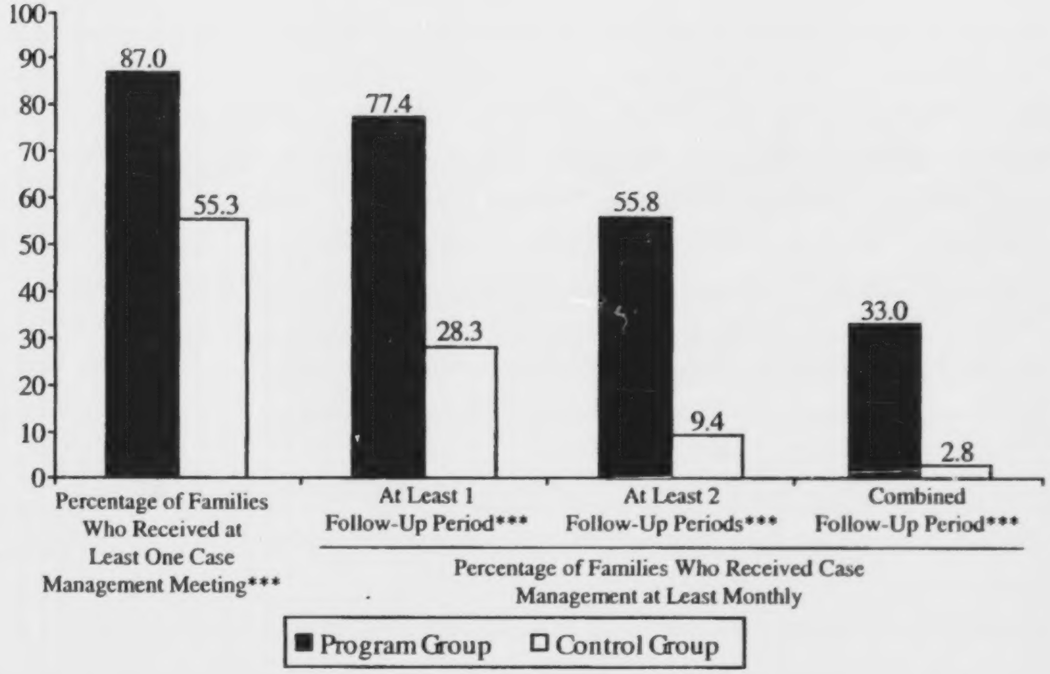
The Early Head Start programs also did not have a significant impact on families' receipt of mental health services. Twenty-three percent of program families reported receiving mental health services during the follow-up period, compared to 22 percent of control families.

d. Impacts on Receipt of Other Family Development Services

An important focus of Early Head Start services was supporting families' progress toward self-sufficiency goals. The programs significantly increased families' receipt of services designed to promote self-sufficiency, including education-related services, employment-related services, and transportation services. The programs increased primary caregivers' receipt of

FIGURE IV.7

IMPACTS ON RECEIPT OF CASE MANAGEMENT SERVICES DURING THE COMBINED FOLLOW-UP PERIOD



Source: Parent Services Follow-Up Interviews conducted approximately 7, 16, and 28 months after random assignment.

Note: All percentages are regression-adjusted means estimated using models that weight each site equally. The differences between program and control families are estimated impacts per eligible applicant.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE IV.3

IMPACTS ON FAMILY HEALTH CARE SERVICES[a] AND HEALTH STATUS DURING THE COMBINED FOLLOW-UP PERIOD

	Program Group	Control Group	Estimated Impact per Eligible Applicant
Percentage of Families Who Received Any:			
Family health services	97.3	97.9	-0.6
Mental health services	22.5	21.5	1.0
Average Self-Reported Health Status of Parent or Guardian When Child Was 36 Months Old[b]	3.4	3.5	-0.0
Sample Size	**1,061-1,093**	**1,000-1,009**	**2,062-2,093**

SOURCE: Parent Services Follow-Up Interviews conducted approximately 7, 16, and 28 months after random assignment and Parent Interviews conducted when children were approximately 14, 24, and 36 months old.

NOTE: All percentages are regression-adjusted means estimated using models that weight each site equally. The differences between program and control families are estimated impacts per eligible applicant.

[a] Family health care services include services received by all family members except the focus child.

[b] Primary caregivers rated their own health status on a scale of 1 (poor) to 5 (excellent).

*Significantly different from zero at the .10 level, two-tailed test

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

education-related services (participation in school or job training or discussion about education services with a case manager). Eighty-seven percent of program families received these services, compared with 59 percent of control families (Figure IV.8). Likewise, programs increased families' receipt of employment-related services (job search assistance or discussion about finding a job with a case manager). Seventy-seven percent of program families received these services compared with 46 percent of control families. Programs also increased families' receipt of transportation services. One-third of program families received these services compared to 23 percent of control families. Early Head Start programs had no statistically significant impact on families' receipt of housing services, including subsidized housing, rental assistance, help finding housing, energy assistance, and emergency housing.

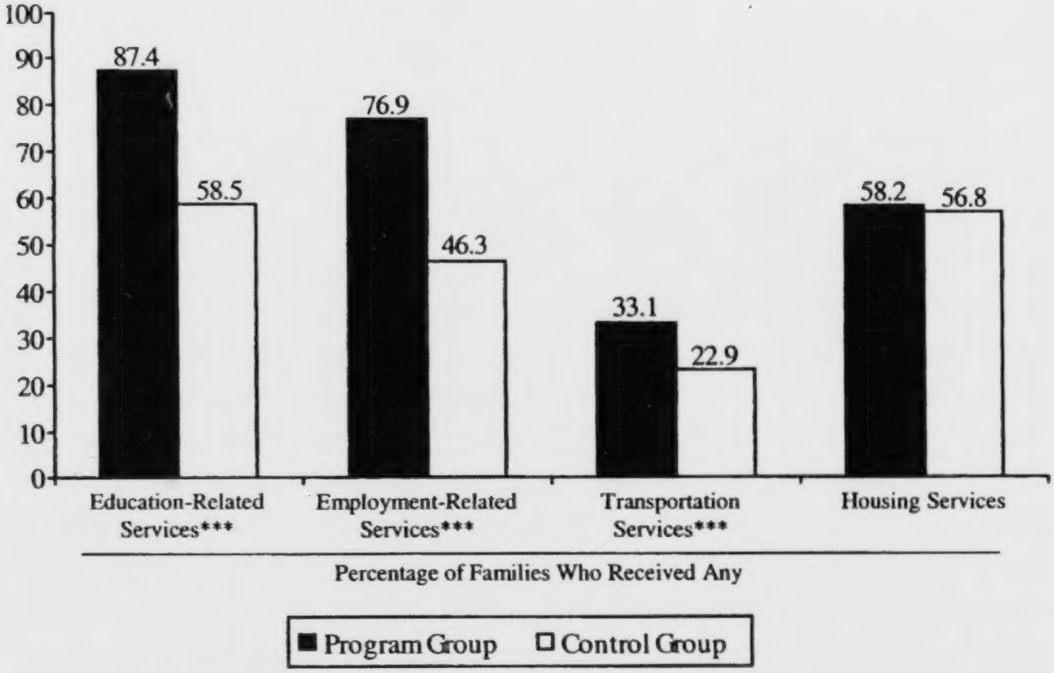
B. DIFFERENCES IN PROGRAM IMPACTS ON RECEIPT OF SERVICES ACROSS SUBGROUPS OF PROGRAMS

It is important to go beyond overall impacts on service receipt described in the previous sections and explore variations in impacts on service receipt among targeted subgroups of programs. Variations in program impacts on service receipt may help explain differences in program impacts on child and family outcomes for subgroups of programs, and may highlight successes and challenges that particular groups of programs experienced in providing services to families. This section describes key differences in impacts on service receipt across subgroups of programs.

Caution must be used in interpreting the variations in impacts on service receipt among subgroups of programs. Most subgroups are defined on the basis of a single program characteristic, but the groups may differ in other characteristics. These other unaccounted-for variations in program characteristics may also influence the variation in impacts on service receipt. Thus, in our analyses, we focus on patterns of impacts across outcomes and consider the

FIGURE IV.8

IMPACTS ON RECEIPT OF FAMILY DEVELOPMENT SERVICES DURING THE COMBINED FOLLOW-UP PERIOD



Source: Parent Services Follow-Up Interviews conducted approximately 7, 16, and 28 months after random assignment.

Note: All percentages are regression-adjusted means estimated using models that weight each site equally. The differences between program and control families are estimated impacts per eligible applicant.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

potential role of other differences in characteristics that may have influenced the outcomes being examined (Appendix Tables E.IV.1 and E.IV.12 show the configuration of family characteristics across the research sites and for select subgroups).

The program subgroup analyses show that the impacts of the Early Head Start programs on service receipt were broad-based and not limited to a particular subset of programs. The estimated impacts on families' receipt of key services were large and statistically significant in nearly all the program subgroups we examined. Although the impacts on service receipt were large for all groups of programs, the magnitude of the impacts varied among subgroups, usually in expected directions. The variations in impacts on service use among subgroups of Early Head Start programs discussed in the sections that follow can inform our understanding of which program features may promote higher levels of participation and service receipt. The following subsections describe the differences in program impacts by program approach and pattern of implementation. We also examined some other site-level subgroups to explore whether Early Head Start impacts on service use varied among urban and rural locations or among programs located in states with and without welfare regulations requiring parents to engage in work activities while their youngest child was under 1 year old. Since the latter analyses did not suggest that these were important ways of classifying programs to understand impacts on services or on children and families, we do not discuss these subgroups here, but tables presenting the impacts for these subgroups are included in Appendix E.IV.

1. Difference in Impacts on Service Receipt by Program Approach

As described in Chapter I, the Early Head Start programs adopted different approaches to providing child development services, based on the unique needs of the children and families in their communities. In 1997, four programs offered center-based services only, seven offered home-based services only, and six took a mixed approach by offering both home- and center-based services.[9]

We expected to find differences in program impacts on service receipt that reflected the different approaches these programs took to serving children and families. In general, the differences in impacts are consistent with our expectations. Home-based programs had the largest impacts on receipt of any home visits, weekly home visits during at least one follow-up period and during all three follow-up periods, and parent-child group socialization activities (Figure IV.9 and Appendix Table E.IV.3). Center-based programs had the largest impacts on use of center-based child care and on the weekly out-of-pocket cost of care. Center-based programs also had a large, negative impact on the use of individual child care subsidies or vouchers, probably because they provided center-based child care for free and did not require most families to obtain individual child care subsidies or vouchers to pay for the care. Mixed-approach programs tended to produce impacts that were between those of home- and center-based programs but were often closest in magnitude to the impacts of home-based programs.

Overall, home-based and mixed-approach programs had the largest impacts on the receipt of any key services, and home-based programs had the largest impacts on receipt of core child development services. These differences reflect both lower levels of service receipt by program families in center-based sites and greater receipt of services by control families in those sites. Home-based and mixed-approach programs had the largest impacts on receipt of a range of family development services, including case management, education-related services, employment-related services, and transportation. Only center-based programs, which were

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[9] Over time, many of the home-based programs increased their efforts to ensure that the child care used by program families was of good quality, and some began offering a small number of child care center slots. However, few research sample members used these slots.

FIGURE IV.9

SELECTED IMPACTS ON SERVICE RECEIPT BY PROGRAM APPROACH

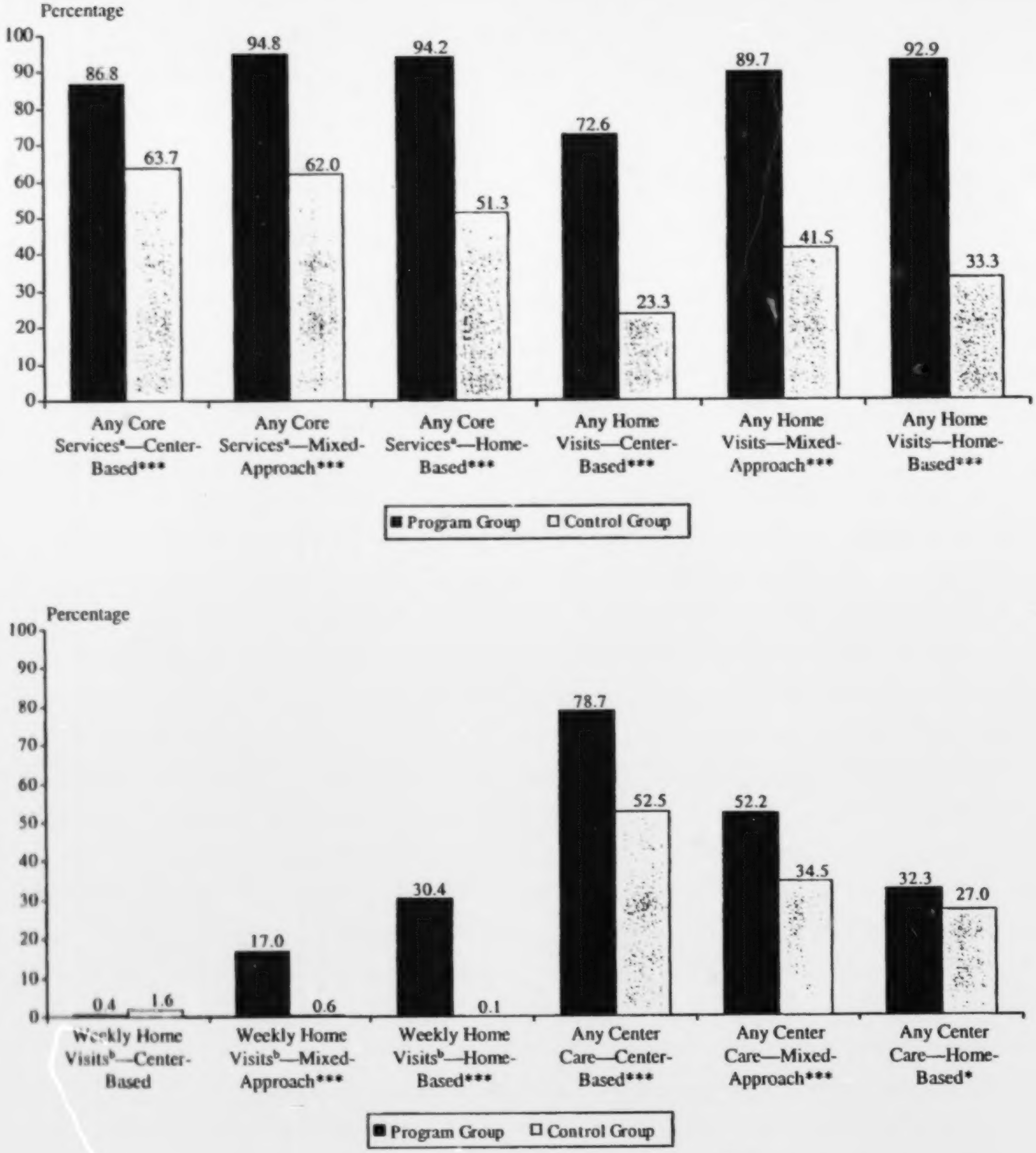

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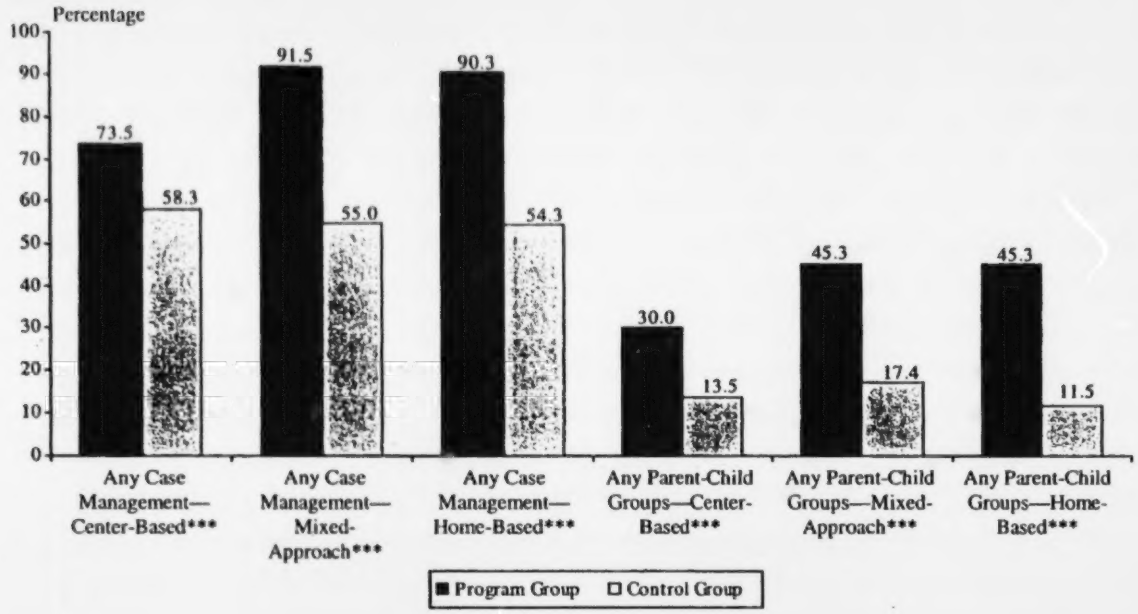
FIGURE IV.9 (continued)



Source: Parent Services Follow-Up Interviews conducted approximately 7, 16, and 28 months after random assignment.

Note: All percentages are regression-adjusted means estimated using models that weight each site equally. The difference between program and control families are estimated impacts per eligible applicant.

[a]Any home visits or center-based child care.

[b]Weekly home visits during the combined follow-up period.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

located in areas where control families were much less likely to report receiving housing assistance, significantly increased receipt of housing services (Appendix Table E.IV.4).

2. Differences in Program Impacts on Service Receipt by Implementation Status

Based on the ratings developed for the implementation study, the research programs differed in their patterns of overall program implementation. As summarized in Chapter I and reported more fully in *Pathways to Quality* (Administration on Children, Youth and Families 2002), six programs were rated as fully implemented in fall 1997 (early implementers), six were not rated as fully implemented in fall 1997 but were rated as fully implemented in fall 1999 (later implementers), and five were not rated as fully implemented at either time (incomplete implementers). The incomplete implementers either emphasized family support (with less emphasis on child development) or faced difficult implementation challenges (such as early staff turnover in leadership positions or partnerships that did not work out well).

The implementation ratings were based in part on staff reports of the frequency of services delivered, so we expected that the level and intensity of service receipt reported by program families would be highest among the early implementers. Thus, if levels of service receipt among control families in the early, later, and incompletely implemented program sites were similar, we would also expect the impacts on service use to be largest among the early implementers. The findings generally conform to this expected pattern.

Early implementation was associated with larger impacts on receipt of core child development services—home visits and center-based child care. Although programs in all three groups significantly increased receipt of these services, the impacts were consistently largest among programs that became fully implemented early (Figure IV.10 and Appendix Table E.IV.4). The large impacts of early implementers on receipt of core child development services

FIGURE IV.10

SELECTED IMPACTS ON SERVICE RECEIPT BY IMPLEMENTATION STATUS

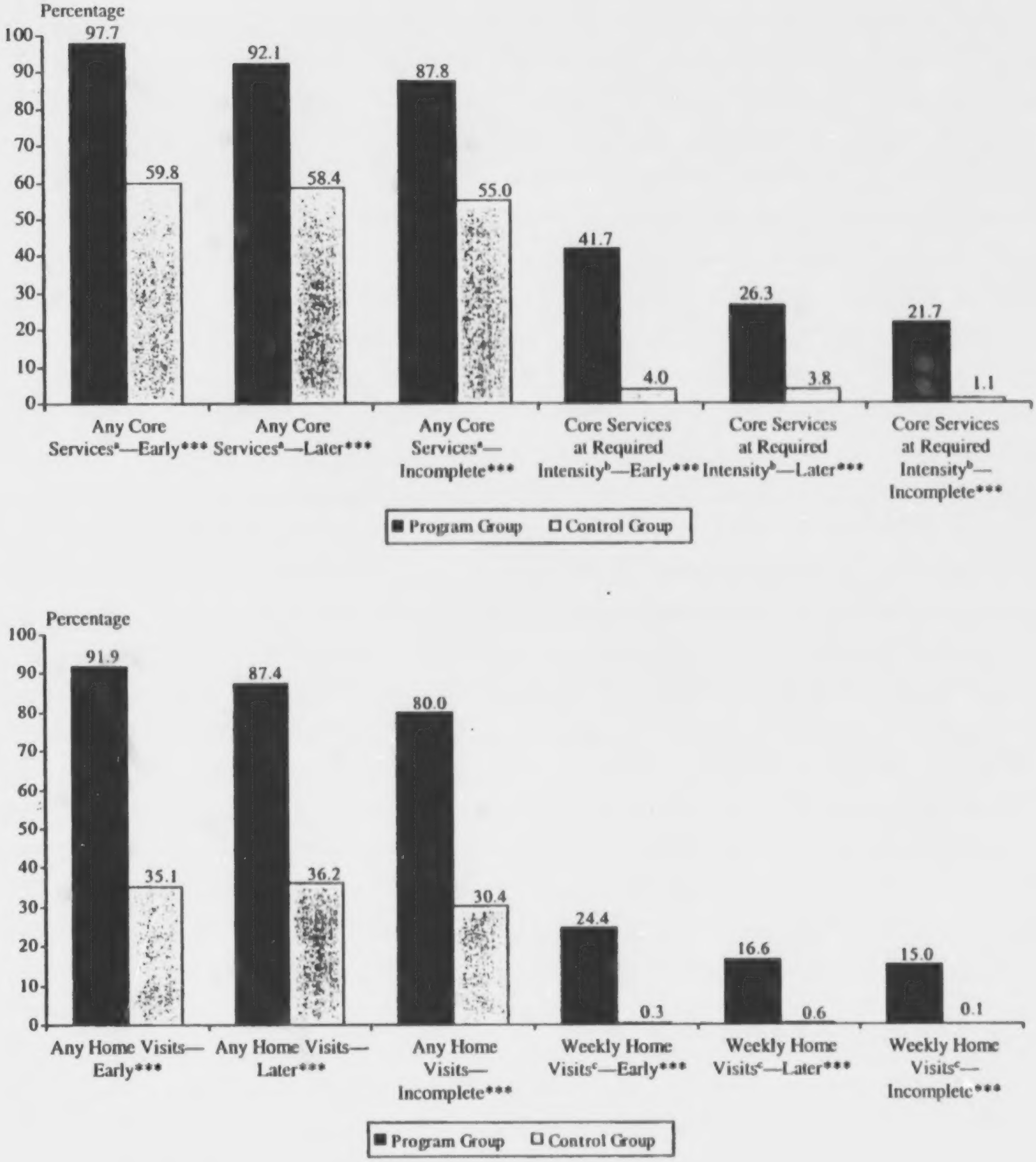
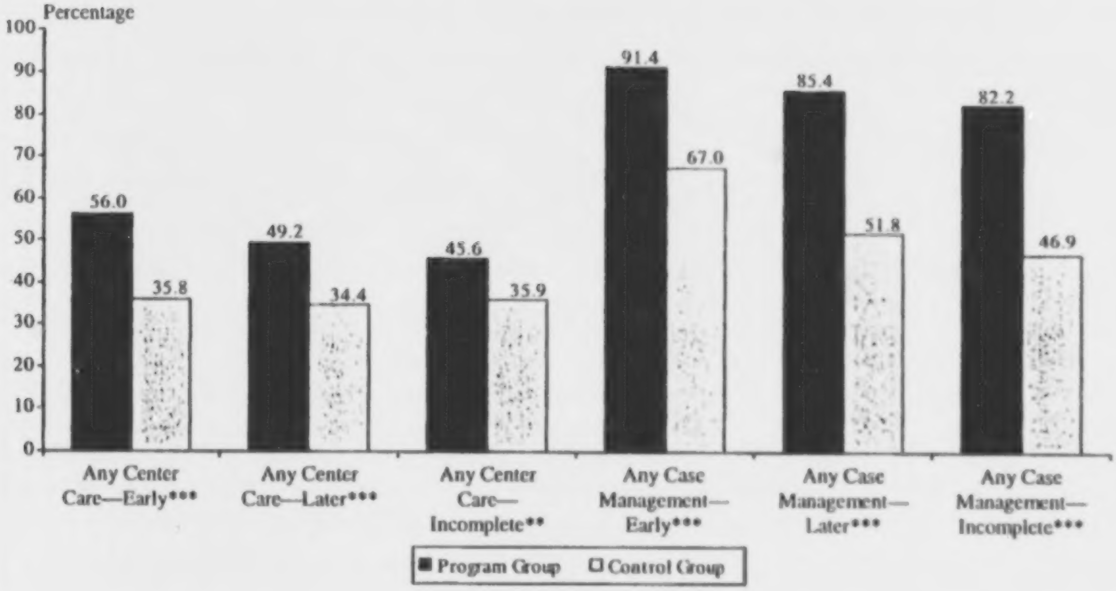


FIGURE IV.10 (continued)



Source: Parent Services Follow-Up Interviews conducted approximately 7, 16, and 28 months after random assignment.

Note: All percentages are regression-adjusted means estimated using models that weight each site equally. The difference between program and control families are estimated impacts per eligible applicant.

[a]Any home visits or center-based child care.

[b]Weekly home visits or at least 20 hours a week of center-based child care during the combined follow-up period.

[c]Weekly home visits during the combined follow-up period.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

were generally due to higher levels of service receipt in the program group, not lower levels in the control group.

Impacts on receipt of core child development services at the intensity required by the revised Head Start Program Performance Standards were also largest among programs that became fully implemented early. For example, families served by early implementers were much more likely than program families in the other programs to receive core child development services at the required intensity in at least one follow-up period and throughout the combined follow-up period.

The overall implementation ratings used to form subgroups of early, later, and incomplete implementers take into account program implementation in all areas—child development, family partnerships, staff development, community partnerships, and program management. Because implementation of child and family development services may have the strongest linkages to child and family outcomes, we also examined subgroups based on the implementation ratings in these key areas. We formed two groups—those that reached full implementation in *both* child and family development in both periods (fall 1997 and fall 1999), and those that did not. The group that reached full implementation in child and family development in both periods consists of four of the six early implementers described at the beginning of this section.

The programs that reached full implementation in child and family development in both time periods had larger impacts on receipt of a range of services. For example, they had larger impacts on receipt of any key services, core child development services, home visits, center-based child care, and several family development services (see Appendix Table E.IV.5). In addition, these fully implemented programs had larger impacts on most measures of service intensity, such as receipt of core child development services at the required intensity, weekly home visits, and weekly case management. The programs that were not fully implemented in child and family development in both time periods had slightly larger impacts on group parenting activities.

It is possible that other factors might explain differences in impacts by implementation pattern. For example, differences in program approaches or family characteristics could be confounded with implementation pattern. Within the mixed-approach and home-based programs, however, it is possible to examine differences in impacts by implementation pattern while holding program approach constant.[10] The results provide evidence confirming that fully implementing the performance standards makes a difference in the magnitude of impacts on service use. In the following subsections, we describe differences in impacts by implementation pattern for mixed-approach and home-based programs.

a. Differences in Impacts on Service Receipt for Mixed-Approach Programs by Implementation Status

Among the six programs that took a mixed approach to service delivery, three were early implementers (rated as fully implemented in fall 1997 and 1999), two were later implementers (rated as fully implemented in fall 1999 but not in 1997), and one was an incomplete implementer (not rated as fully implemented in either time period). One of the mixed-approach early implementers provided center-based services through contracts with community child care centers; the other two provided care to small numbers of program children in Early Head Start centers. The incomplete implementer and one of the later implementers provided Early Head Start center care to a large proportion of program families, and the other later implementer provided Early Head Start center care to a smaller number of families. Thus, program families in the mixed-approach programs that were later or incomplete implementers were more likely to receive Early Head Start center care, compared with families served by mixed-approach early implementers.

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[10] We were unable to examine differences in implementation within the center-based programs, because only 4 of the 17 research programs were center-based. In addition, the analysis of implementation within the mixed-approach and home-based programs required dividing the implementation patterns differently in order to have enough programs in each subgroup for the analysis. Thus, within mixed-approach programs, we compared early implementers with later and incomplete implementers. Within home-based programs, we compared early and later implementers with incomplete implementers.

Program impacts on service use and intensity, by implementation pattern within mixed-approach programs, suggest that early, full implementation of key elements of the performance standards resulted in larger impacts on service receipt among families in mixed-approach programs. The mixed-approach early implementers had larger impacts on receipt of any key services, any core child development services (home visits or center-based child care), and core child development services provided at the intensity required by the Head Start Program Performance Standards (weekly home visits or 20 hours per week of center-based child care) (Figure IV.11 and Appendix Table E.IV.6). The group of mixed-approach later and incomplete implementers had a larger impact on receipt of any home visits, because control families in those sites were much less likely than control families in the early-implemented, mixed-approach sites to receive home visits. However, the mixed-approach early implementers had much larger impacts on receipt of home visits at least weekly.

The mixed-approach later and incomplete implementers also had a much larger impact on receipt of case management services. Their larger impact reflects the fact that control families in sites where mixed-approach early implementers were located were much more likely than those in the other sites to receive case management services.

b. Differences in Impacts on Service Receipt for Home-Based Programs by Implementation Status

Among the seven programs that took a home-based approach to service delivery, one was an early implementer, three were later implementers, and three were incomplete implementers. To have sufficient programs in each subgroup to conduct the analysis, we combined early and later

FIGURE IV.11

SELECTED IMPACTS ON SERVICE RECEIPT FOR MIXED-APPROACH PROGRAMS BY IMPLEMENTATION STATUS

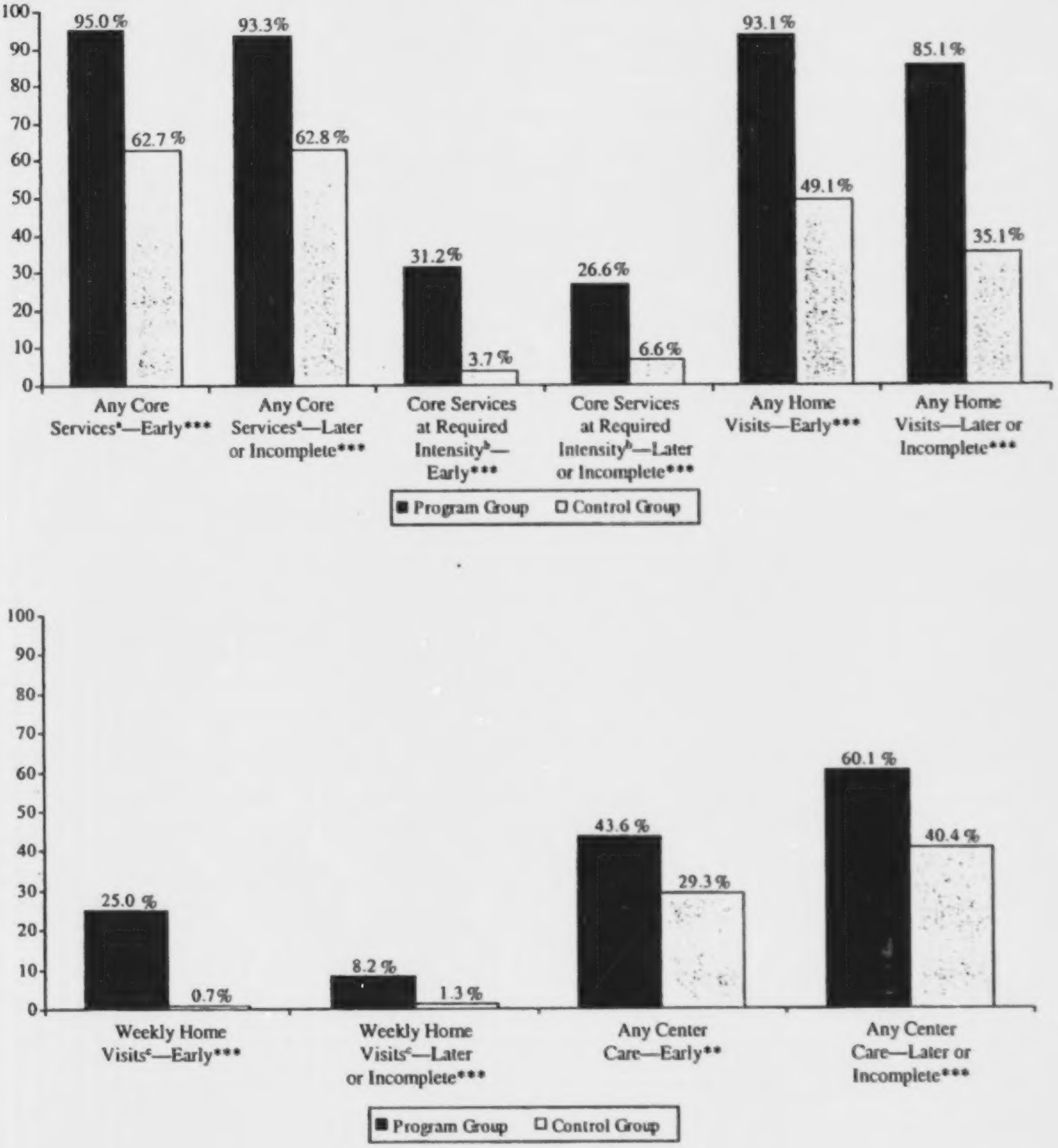

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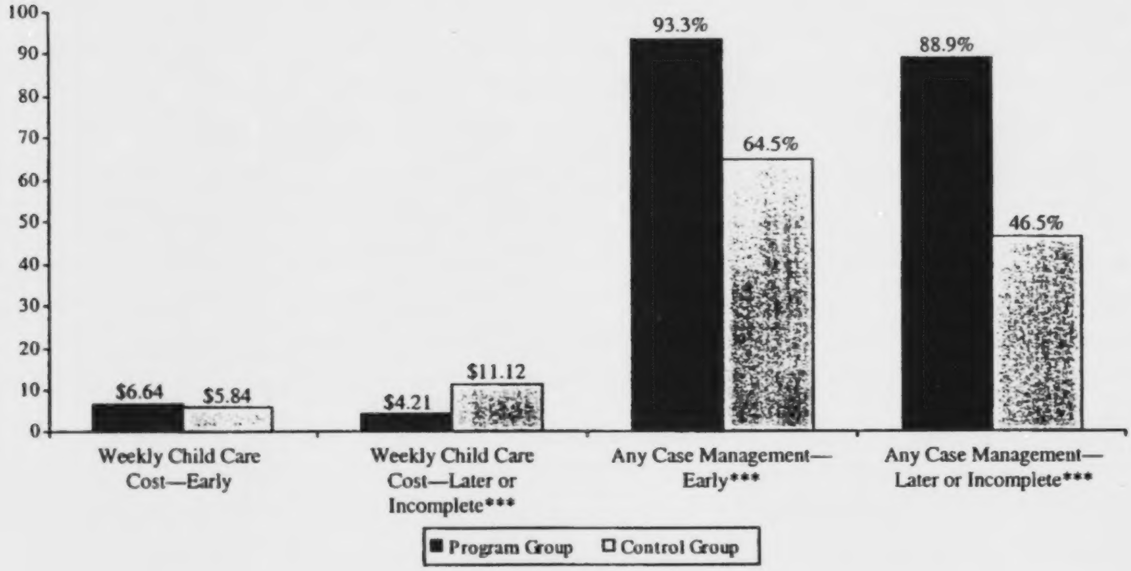
FIGURE IV.11 (continued)



Source: Parent Services Follow-Up Interviews conducted approximately 7, 16, and 28 months after random assignment.

Note: All percentages are regression-adjusted means estimated using models that weight each site equally. The difference between program and control families are estimated impacts per eligible applicant.

[a]Any home visits or center-based child care.

[b]Weekly home visits or at least 20 hours a week of center-based child care during the combined follow-up period.

[c]Weekly home visits during the combined follow-up periods.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

implemented home-based programs into one subgroup and compared them to the home-based incomplete implementers.

Programs in both subgroups had large impacts on receipt of services in most of the service areas we examined, and differences in the size of impacts across the two subgroups were, in most cases, small (Figure IV.12 and Appendix Table E.IV.6). An exception to this pattern was the difference in the programs' impact on participation in parent-child group socialization activities. The early- and later- implemented home-based programs had a substantially larger impact on participation in parent-child group socialization activities (49 percentage points in the early/late group compared to 16 in the incomplete group). This difference was due to differences in the proportion of program families who received these services, rather than to differences in service receipt among control families.

Several factors may account for the similarities in patterns of service use impacts in early and later compared to incompletely implemented home-based programs. First, only one of eight home-based programs achieved early implementation—the group in which we would expect to see the largest rates of participation in program services. Second, home-based programs that were not fully implemented often had strong family support components and provided frequent home visits and case management services. Other factors, such as the content of home visits and an insufficient emphasis on child development relative to other issues during the visits, prevented these programs from being rated as fully implemented. These other factors (such as topics covered during home visits), however, were not captured in our measures of service use and intensity. Thus, our measures may not incorporate some features of fully implemented programs that could account for differences in impacts on child and family outcomes across home-based programs with different patterns of implementation.

FIGURE IV.12

SELECTED IMPACTS ON SERVICE RECEIPT FOR HOME-BASED PROGRAMS BY IMPLEMENTATION STATUS

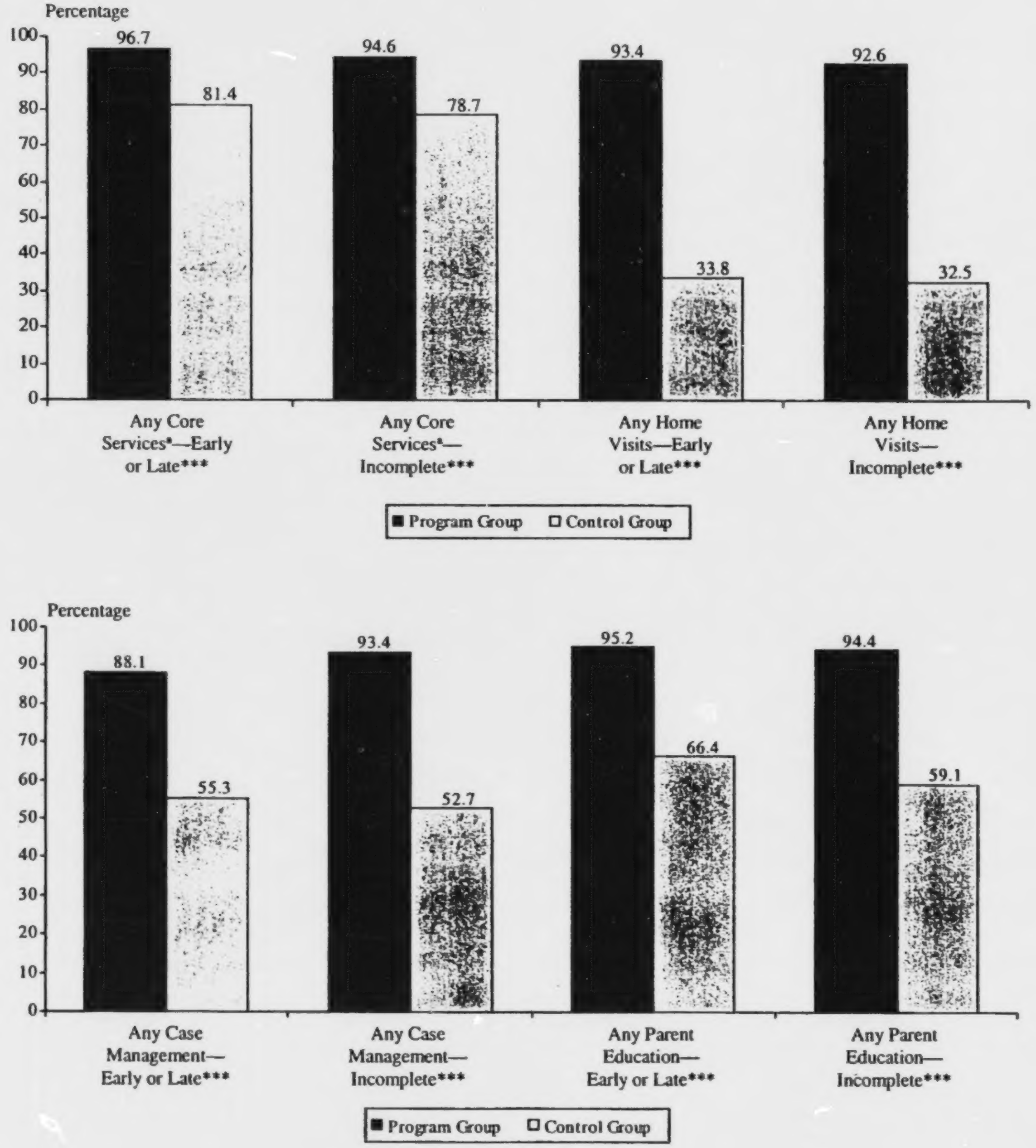
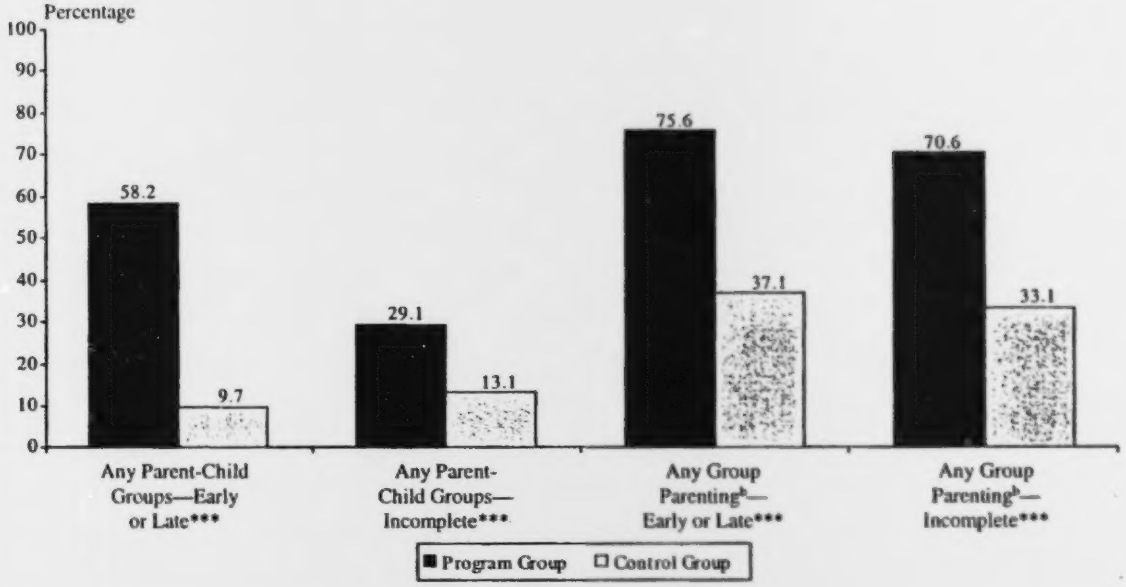


FIGURE IV.12 (continued)



Source: Parent Services Follow-Up Interviews conducted approximately 7, 16, and 28 months after random assignment.

Note: All percentages are regression-adjusted means estimated using models that weight each site equally. The difference between program and control families are estimated impacts per eligible applicant.

[a]Any home visits or center-based child care.

[b]Any parent education classes, parent support groups, or parent-child group socialization activities.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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C. IMPLICATIONS FOR CHILD AND FAMILY OUTCOMES

The Early Head Start programs succeeded in greatly increasing the extent to which families received key program services, especially core child development services. Moreover, they provided much more intensive services than control families received from other sources in their communities. The estimated program impacts on the receipt of key program services and core child development services (home visits and center-based child care) were significant, large, and broad-based during the combined follow-up period.

Programs that fully implemented key Head Start Program Performance Standards early achieved the largest impacts on receipt of core child development services and on the receipt of intensive services. Because early, full implementation of the performance standards was associated with the delivery of intensive services to more families, the differences in impacts on child and family outcomes by implementation pattern can provide insights into the effects of "higher dosages" of Early Head Start services. In other words, if the early implemented programs have the largest impacts on child and family outcomes, then it is likely that part of the difference in the impacts associated with early implementation can be attributed to the more intensive services that families in those programs received, and the magnitude of the difference in impacts is in part an indicator of the importance of service intensity in producing the larger impacts.

In several service areas, the estimated impacts on service receipt were small, and most were not statistically significant. In particular, because nearly all children and families received some health services, the Early Head Start programs generally did not have a significant impact on health care receipt; even when impacts on health care receipt were significant, they were very small. Consistent with the lack of large differences in health care receipt, the estimated impacts on broad measures of the overall health status of children and primary caregivers were not significant. Finally, estimated impacts on identification of children eligible for early intervention services and receipt of early intervention services were statistically significant but small, and the proportion of identified children was fairly low in both the program and control groups.

The Early Head Start programs also did not have a significant impact on families' receipt of mental health services. All of the programs made referrals to mental health services when they identified needs, and some provided some mental health services directly. While nearly a quarter of program families reported receiving mental health services, a similar proportion of control families also reported receiving mental health services. Thus, it appears that outreach to families with mental health service needs by other service providers was effectively reaching control families, or the programs were not able to enhance families' access to mental health care.

The following chapters explore whether these impacts on service receipt led to impacts on child and family outcomes.

V. EARLY HEAD START PROGRAMS' OVERALL IMPACTS ON CHILDREN'S DEVELOPMENT, PARENTING, AND FAMILY WELL-BEING

This chapter presents findings from our analysis of the overall impacts of 17 Early Head Start programs on the children and families they served. The chapter begins with a brief discussion of the various ways in which Early Head Start programs work with parents and children and suggests why these programmatic strategies can be expected to have positive influences on children's development, parenting behaviors and attitudes, and other aspects of child and family well-being. In some cases, the different program approaches implemented by Early Head Start programs, as discussed in Chapter I, are expected to have different patterns of impacts. Those differences, as well as differences in impacts related to patterns of program implementation, are presented in Chapter VI. In Chapter VII, we explore how children and parents who entered the program with different characteristics fared. First, however, this chapter focuses on the overall impacts—the ways in which Early Head Start programs, on average, were found to make a difference in the lives of the families they have served during the first three years of the children's lives.

In developing hypotheses to guide our analysis and interpretations, we have drawn on research literature, the experiences of other programs, but also, to considerable degree, on site visit discussions with Early Head Start program staff about their theories of change.[1] Following the presentation of findings from the national study, we present findings in "boxes" that address impacts of the program on Early Head Start fathers and local research reports that pertain to site-specific findings.

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[1] See the discussions in two implementation reports, *Leading the Way,* Vol. I (ACYF 1999) and *Pathways to Quality* (ACYF 2002).

One of the major goals of Early Head Start is to improve the cognitive, social, and emotional development of infants and toddlers in low-income families. Programs seek to accomplish these aims by working directly with the child in center-based care, during home visits, or both, and to support this work through health, nutrition, and parent education services. Programs also support children's development indirectly by working with parents and providing parent education to support close parent-child relationships, which are expected to enhance the longer-term development of infants and toddlers.

Close relationships provide infants and toddlers with the emotional support necessary for developing trusting relationships with important adults in their lives, learning to regulate their emotional responses, and playing cooperatively with their peers. Trusting relationships also support cognitive development (especially cause-and-effect reasoning) and communication skills. Parent-child interactions that also include talking, reading, teaching, and encouragement of new developmental experiences can promote the cognitive development of infants and toddlers. Parents support their children's cognitive development by creating a supportive and stimulating learning environment in the home.

A strong parent-child relationship is expected to support and extend the development of infants and toddlers while families participate in the Early Head Start program and well into the future, as parents continue to guide children in the years after Early Head Start services end. In addition, programs focus to some degree on improving parent and family well-being, which can constitute a third, but more indirect, influence on child outcomes. Programs may seek to improve family functioning and in so doing may help parents move toward self-sufficiency; improvements in self-sufficiency, in turn, will offer families more resources to support a more cognitively stimulating home environment and activities for the child.

Parents' ability to develop a supportive relationship with their children and make progress toward self-sufficiency may depend on their mental health and various aspects of family functioning. For example, parents who are depressed or who live in families with high levels of conflict may have difficulty in nurturing their children and functioning in the workplace. The effects of stress, conflict, and depression on children may be mediated by the parent-child relationship. Programs attempt to address mental health and family functioning in a variety of ways, but it is very challenging for them to overcome these substantial barriers to the development of supportive parent-child relationships and economic self-sufficiency.

Early Head Start eligibility guidelines require that at least 90 percent of enrolled families have incomes below the poverty line. While they have many strengths, families at this income level often struggle for survival, and financial concerns can interfere with parenting. Therefore, to develop support for the children, many programs aim to help families become economically stable and move toward self-sufficiency.

A. HYPOTHESES AND BRIEF SUMMARY OF FINDINGS

Early Head Start was designed as an intervention to support children's development, promote supportive parent-child relationships, and assist families in their efforts to attain self-sufficiency. As described in Chapter III, Early Head Start programs provided extensive services of many kinds to their families, and the broad range of services families received would be expected to promote such outcomes. Further, in most areas, as reported in Chapter IV, Early Head Start families received substantially more services than their control-group counterparts did. The differences in receipt of parent education, home visits, center-based care, and case management, both overall and at the intensity required by Head Start program performance standards, support hypotheses of both direct and indirect impacts on children, parenting and the home environment, and self-sufficiency outcomes.

The programs' focus on child development and parenting leads us to expect impacts on child cognitive, language, and social-emotional development and on parenting practices and knowledge. We further expect that the case management support provided by programs has the potential to enhance parents' mental health, family functioning, and self-sufficiency. In addition, as a consequence of the programs' focus on family development and enhancements in the quality of child care that programs provide or arrange for, we expect modest impacts on self-sufficiency.

To summarize the 3-year findings briefly, before presenting them in detail, Early Head Start had favorable impacts on a wide range of outcomes for children and parents. For the most part, the impacts found at 2 years were sustained at age 3.

- For children, the programs produced positive impacts on cognitive and language development at age 3, sustaining the impacts found when children were 2.
- For children, the programs produced favorable impacts on aspects of social-emotional development at age 3, broadening the range of impacts on these behaviors found at age 2. At age 3, Early Head Start children engaged their parents more, were more attentive during play, and showed less negativity toward parents during play compared to control-group children, and levels of aggressive behavior were lower than for control children.
- When children were 3, Early Head Start programs continued to have positive impacts on parenting behavior, including emotional support and support for the child's language development and learning. The programs also led to lower levels of insensitive and hostile parenting behavior and to the use of less-punitive discipline strategies.
- At age 3, we found no overall impacts on measures of parent's health or mental health and family functioning, although some had been seen when children were 2.
- Important for parent self-sufficiency, overall results showed continued impacts on training and education activities, with some emerging impacts on employment (but not in average hours worked per week), and fewer subsequent births among Early Head Start mothers.

B. OUTCOME MEASURES USED AT AGE 3

Measures of children's behavior and development, parenting, and family development were chosen to assess areas that Early Head Start was expected to influence, and that are important indications of favorable early development. We selected measures that had been used in previous evaluations and large-scale studies of children and families. We used multiple methods of measurement, including direct assessments of children; parent report; interviewer observation of the parent and child during the in-home interview; and videotaped, semistructured parent-child interaction tasks that were later coded by trained psychologists following a standard protocol. Use of multiple methods for measuring outcomes within a single domain avoids reliance on any single method that may have particular biases or inaccuracies.

Next, we provide an overview of the domains of child development, parenting, parent mental health, family functioning, and self-sufficiency activities measured at the most recent follow-up point. Descriptions of the particular measures used are provided throughout this chapter in boxes next to each table of impact estimates to help in interpreting the findings in each area. Details on the measures' psychometric properties are given in Appendix C.

1. Child Development Measures

Cognitive development is a critical area to measure at this early age because of the foundation that knowledge and such skills as problem solving establish for later success in school. Language development is important as a foundation for cognitive and social development. Infants and toddlers are in a particularly sensitive period for language development; language delays during this period can persist, and may inhibit the acquisition of reading skills later on. We conducted direct assessments of children's cognitive and language development.

Social-emotional development, including persistence and self-control, are developing during infancy and toddlerhood and contribute to children's ability to learn in a variety of settings. Greater self-control, less-aggressive behavior, and a more positive relationship with the parent are important foundations for relationships with peers and with other adults. We used a combination of parent report and observation to measure children's social-emotional development.

2. Parenting and Home Environment Measures

To measure the impacts of Early Head Start on parenting behavior and the home environment, we tapped four important areas:

1. Emotional support, which includes the parent's warmth and affection toward the child, positive feelings about the child that are conveyed to others, and appropriate responses to needs that the child communicates
2. Stimulation of language and learning, which includes talking and reading to the child regularly, encouragement for learning basic concepts such as colors, numbers, and the alphabet, and the parent's approach to assisting the child with a challenging task
3. Negative aspects of parenting behavior, which include insensitivity, emotional detachment from the child, hostility, anger, and punitiveness
4. The parent's knowledge about safety and discipline strategies

Measures of parenting behavior and the home environment were collected using several different methods, including parents' self-report, observations conducted by in-home interviewers, and coded videotaped interactions with their child, which guarded against biases and inaccuracies that can arise when relying on a single measurement strategy.

3. Measures of Parent Health and Mental Health, Family Functioning, and Self-Sufficiency

Parent health and mental health and family well-being are important, both for supporting parent-child relationships and for parents' progress toward self-sufficiency. In fact, a number of programs described a theory of change that included such constructs as parent mental health as important expected outcomes. Nevertheless, these outcomes are not the main focus of most program services, and they are particularly challenging for programs to influence. We included brief, parent-report measures of these outcomes that have been widely used in empirical studies and have demonstrated validity. Measures of parent health, mental health, and family functioning include health status, feelings of depression, family conflict, and stress related to parenting. Measures of economic self-sufficiency tap education and training, employment, welfare program participation, family income, and births since enrollment.

4. Data Sources for Child, Parent, and Family Measures

Data come from two major sets of follow-up measures (see Chapter II and Appendix C for details). Assessment of children's development and some aspects of parenting behavior require standardization or modification as children get older; thus, measures of these constructs were collected at specific age levels (when children were approximately 14, 24, and 36 months old). Outcomes closely related to child development and parenting, including mental health and family functioning, were also collected during the birthday-related interviews. Self-sufficiency activities, like the receipt of program services, are likely to be influenced by the length of the intervention. Therefore, information on these outcomes was collected at intervals after the family enrolled in Early Head Start (on average at 7, 16, and 28 months).

C. OVERALL IMPACTS ON CHILDREN'S DEVELOPMENT

Early Head Start programs had favorable impacts on a broad range of child development outcomes at age 3. This section discusses the programs' impacts on cognitive and language development and on social-emotional development. Overall, the programs' impacts on children's cognitive and language development at age 2 were sustained at age 3, and impacts on social-emotional development at age 3 were greater and broader than they had been at age 2.

1. Overall Impacts on Cognitive and Language Development

Early Head Start enhanced children's cognitive and language development at age 3, sustaining the positive impacts on cognitive development and language found at age 2 (Box V.1 describes the measures and Table V.1 presents the impacts). Early Head Start children scored higher on the Bayley Mental Development Index (MDI) at age 3 than control children, replicating the findings at age 2. Perhaps even more important, fewer Early Head Start than control children scored below 85 on the MDI (one standard deviation below the standardized mean). Reducing the number of children scoring below this threshold may be indicative of Early Head Start programs potentially reducing the need for special education services. This effect was first seen at age 2 and was sustained through age 3.

At age 3, the Peabody Picture Vocabulary Test, Third Edition (PPVT-III), a test of children's receptive vocabulary, was administered. Early Head Start children scored higher on the PPVT-III at age 3 than control children. In addition, fewer Early Head Start than control children scored below 85 on the PPVT-III. At age 2, the significant positive vocabulary impacts were based on parent-reported vocabulary; it is noteworthy that this effect was sustained when this widely used, standardized direct assessment of receptive vocabulary was administered when children were 3 years old. Children who spoke Spanish in the home were assessed using the *Test de Vocabulario en Imagenes Peabody* (TVIP), which measures receptive vocabulary in Spanish. We found no significant impacts on the TVIP standard scores or on the percentage with scores below 100. Fewer than 200 children were assessed using this measure, however.

To investigate supporting evidence for the impacts on receptive vocabulary, we factor analyzed the Bayley and found a "language/reasoning" factor. Early Head Start programs had a significant impact on this outcome.[2] While this factor is not an accepted standard measure (and is highly correlated with the MDI at $r = .78$), this finding suggests an impact of Early Head Start on broader aspects of language development than receptive vocabulary, since the Bayley items include observations of the extent and complexity of the child's spoken language (language production).

---

[2] The program-group mean was 5.9; the control-group mean was 5.3, for a positive impact of 0.6, statistically different from zero at the .01 level, with an effect size of 17.8.

In summary, the positive Early Head Start impacts on cognitive and language development found when children were 2 years old were sustained through age 3. The reduction in the proportion of children scoring below 85 on the Bayley MDI and PPVT-III may be especially important in reducing the likelihood that children would need special services at an early age. It is important to note that although Early Head Start had positive impacts on children's cognitive and language development, average scores on the cognitive and language assessments for both program- and control-group children remained below the national average.

2. Overall Impacts on Children's Social-Emotional Development

Because policymakers, parents, and caregivers view positive and negative behaviors differently, and because the evaluation obtained data on both aspects of social-emotional development, we present.the results separately here. Although when the children were 2 years old we found no Early Head Start impacts on the positive aspects of children's social-emotional development, when they were a year older, significant positive impacts were found on some aspects of children's behavior during play, as assessed by trained observers of videotaped parent-child interactions (see Box V.2 and Table V.2).

Early Head Start children were more engaging of their parents during play; in other words, Early Head Start children, when compared to controls, were more likely to behave in ways that maintained interaction with their parent. They were also rated as more attentive to objects during play at age 3 than were control children, a behavior pattern that, should it persist, could be important for attending to tasks in later preschool programs the children might attend. Early Head Start programs did not have a significant impact on child behavior during the puzzle

BOX V.1

MEASURES OF COGNITIVE AND LANGUAGE DEVELOPMENT

Bayley Mental Development Index (MDI) – measures the cognitive, language, and personal-social development of children under age 3½. Children were directly assessed by the Interviewer/Assessor following a standardized protocol.

> The MDI is one of three component scales of the Bayley Scales of Infant Development – Second Edition (Bayley 1993). At 36 months, the child is assessed on his/her ability to follow simple spoken directions that indicate an understanding of prepositions, size comparisons, quantities, colors, and simple numbers; on his or her spoken vocabulary during the assessment; on spatial concepts, memory, and the ability to match shapes and identify patterns.
>
> > *For example, the child is asked to build a bridge and a wall of cubes; identify the big tree in a picture; count; understand prepositions like in, under, or between; name four colors; sort pegs by color; place shapes into holes of the same size and shape; use the past tense; and repeat short number sequences.*
>
> The Bayley MDI was normed on a nationally representative sample of children of various ages so that raw scores can be converted to age-adjusted, standardized scores with a mean of 100 and a standard deviation of 15.
>
> > *The **percentage of children with Bayley MDI below 85** measures the proportion with delayed performance, or scores one standard deviation or more below the mean for their age in the nationally representative, standardization sample.*

Peabody Picture Vocabulary Test, Third Edition (PPVT-III) – measures listening comprehension of spoken words in standard English for children and adults from age 2 ½ and over (Dunn and Dunn 1997). The child is presented with four pictures and is asked to point to the picture that matches the word spoken by the interviewer. The PPVT-III was normed on a nationally representative sample of children and adults of various ages so that raw scores can be converted to age-adjusted, standardized scores with a mean of 100 and a standard deviation of 15.

> *The **percentage of children with PPVT-III below 85** measures the proportion with scores one standard deviation or more below the mean for their age in the nationally representative, standardization sample.*

Test de Vocabulario en Imagenes Peabody (TVIP) – measures the listening comprehension of spoken words in Spanish for Spanish-speaking and bilingual children from age 2 ½ to 18 (Dunn, Lloyd, Eligio, Padilla, Lugo, and Dunn 1986). The child is presented with four pictures and is asked to point to the picture that matches the Spanish word spoken by the interviewer. The TVIP was normed on a sample of Mexican and Puerto Rican children of various ages so that raw scores can be converted to age-adjusted, standardized scores with a mean of 100 and a standard deviation of 15.

> *The **percentage of children with TVIP below 100** measures the proportion with scores below the mean for their age in the standardization sample. This cutoff was chosen because only 6 percent of the Early Head Start evaluation sample scored below 85. The higher standardized scores on the TVIP compared to the PPVT-III could be attributable to the fact that norms for the TVIP were developed nearly two decades ago.*

TABLE V.1

IMPACTS ON CHILD COGNITIVE AND LANGUAGE DEVELOPMENT

Outcome	Program Group Participants[a]	Control Group[b]	Estimated Impact per Participant[c]	Effect Size[d]
Cognitive Development				
Bayley Mental Development Index (MDI) Standard Score	91.4	89.9	1.6**	12.0
Percentage with Bayley MDI Below 85	27.3	32.0	-4.7*	-10.1
Receptive Language Development				
Peabody Picture Vocabulary Test (PPVT-III) Standard Score	83.3	81.1	2.1**	13.1
Percentage with PPVT-III Below 85	51.1	57.1	-6.0**	-12.1
Test de Vocabulario en Imagenes Peabody (TVIP) Standard Score	97.2	94.9	2.3	27.1
Percentage with TVIP Below 100	36.2	41.2	-5.0	-9.9
Sample Size				
Bayley	**879**	**779**	**1,658**	
PPVT	**738**	**665**	**1,403**	
TVIP	**95**	**89**	**184**	

SOURCE: Parent interview and child assessments conducted when children were approximately 36 months old.

NOTE: All impact estimates were calculated using regression models, where each site was weighted equally.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities.

[b] The control group mean is the mean for the control group members who would have participated in Early Head Start if they had been assigned to the program group instead. This unobserved mean was estimated as the difference between the program group mean for participants and the impact per participant.

[c] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for all program and control group members.

[d] The effect size was calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact expressed as a percentage of the standard deviation).

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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BOX V.2

MEASURES OF POSITIVE ASPECTS OF CHILD SOCIAL-EMOTIONAL DEVELOPMENT

Child Behavior During Parent-Child Semistructured Play – measures the child's behavior with the parent during a semistructured play task. The parent and child were given three bags of interesting toys and asked to play with the toys in sequence. The semistructured play task was videotaped, and child and parent behaviors were coded on a 7-point scale by child development researchers according to strict protocols (see Appendix C). This assessment was adapted for this evaluation from the Three Box coding scales used in the NICHD Study of Early Child Care (NICHD Early Child Care Research Network 1999). Two positive aspects of children's behavior with the parent were rated on a 7-point scale:

> ***Engagement*** – measures the extent to which the child shows, initiates, or maintains interaction with the parent. This may be expressed by approaching or orienting toward the parent, establishing eye contact with the parent, positively responding to the parent's initiations, positive affect directed toward the parent and/or engaging the parent in play. Very high engagement receives a 7.
>
> ***Sustained Attention with Objects*** – measures the degree to which the child is involved with the toys presented in the three bags. Indicators include degree to which the child "focuses in" when playing with an object and the extent to which the child coordinates activities with several objects and/or explores different aspects of a toy. Very high sustained attention receives a 7.

Child Behavior During Parent-Child Puzzle Challenge Task – measures the child's behavior with the parent during a puzzle completion task. The child was given a puzzle to play with, and the parent was instructed to give the child any help needed. After 3 minutes, or earlier if the puzzle was completed, the interviewer gave the child a second, harder puzzle and asked the mother not to help the child. If that puzzle was completed or 3 minutes elapsed, another, more challenging puzzle was provided. The puzzle challenge task was videotaped, and child and parent behaviors were coded on a 7-point scale by child development researchers according to strict protocols (see Appendix C). The scales are based on a puzzle task used by Brooks-Gunn et al. (1992) in the Newark Observational Study of the Teenage Parent Demonstration. Two positive aspects of children's behavior with the parent were rated on a 7-point scale:

> ***Engagement*** – measures the extent to which the child shows, initiates, or maintains interaction with the parent. This may be expressed by approaching or orienting toward the parent, establishing eye contact with the parent, positively responding to the parent's suggestions, positive affect directed toward the parent and/or engaging the parent in the puzzle task. Very high engagement receives a 7.
>
> ***Persistence*** – measures how goal-oriented, focused, and motivated the child remains toward the puzzle throughout the task. The focus of this measure is on the child's apparent effort to solve the puzzle, not on how well the child performs. Very high persistence receives a 7.

Bayley Behavioral Rating Scale (BRS) – measures the child's behavior during the Bayley MDI assessment. The BRS is one of three component scales of the Bayley Scales of Infant Development – Second Edition (Bayley 1993).

> ***Emotional Regulation*** – measures the child's ability to change tasks and test materials; negative affect; and frustration with tasks during the assessment.
>
> ***Orientation/Engagement*** – measures the child's cooperation with the interviewer during the assessment; positive affect; and interest in the test materials.

The interviewer assesses the child's behavior by scoring items on a 5-point scale, with 5 indicating more positive behavior (for example, less frustration and more cooperation). Scores are the average of the items in the subscale.

TABLE V.2

IMPACTS ON POSITIVE ASPECTS OF CHILD SOCIAL-EMOTIONAL DEVELOPMENT

Outcome	Program Group Participants[a]	Control Group[b]	Estimated Impact per Participant[c]	Effect Size[d]
Engagement of Parent During Parent-Child Semistructured Play[e]	4.8	4.6	0.2***	20.3
Sustained Attention to Objects During Parent-Child Semistructured Play[e]	5.0	4.8	0.2***	15.9
Engagement of Parent During Parent-Child Puzzle Challenge Task[f]	5.0	4.9	0.1	8.8
Persistence During Parent-Child Puzzle Challenge Task[f]	4.6	4.5	0.1	6.3
Bayley Behavior Rating Scale (BRS): Emotional Regulation[g]	4.0	4.0	0.0	0.6
Bayley BRS: Orientation/Engagement[g]	3.9	3.8	0.0	4.0
Sample Size				
Parent-Child Interactions	**875**	**784**	**1,659**	
Bayley BRS	**936**	**833**	**1,769**	

SOURCE: Child assessments, interviewer observations, and assessments of semistructured parent-child interactions conducted when children were approximately 36 months old.

NOTE: All impact estimates were calculated using regression models, where each site was weighted equally.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities.

[b] The control group mean is the mean for the control group members who would have participated in Early Head Start if they had been assigned to the program group instead. This unobserved mean was estimated as the difference between the program group mean for participants and the impact per participant.

[c] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for all program and control group members.

[d] The effect size was calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact expressed as a percentage of the standard deviation).

[e] Behaviors were observed during the videotaped parent-child semistructured play task and coded on a seven-point scale.

[f] Behaviors were observed during the videotaped parent-child puzzle challenge task and coded on a seven-point scale.

[g] Behaviors were observed during the Bayley assessment and rated on a five-point scale by the interviewer/assessor.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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challenge task, as rated by trained coders of videotaped parent-child interactions, or on child behavior during the Bayley assessment, as rated by trained observers during the in-home interviews.[3]

The positive impacts found in the semistructured play interaction suggest that Early Head Start may improve the parent-child relationship and the child's ability to focus on objects during play. By enhancing the degree to which young children maintain interest in exploring objects they are playing with and maintain their interaction with their parent, Early Head Start programs may be contributing to behavior patterns that will help children learn in early learning settings.

These impact analyses were supplemented with growth curve analyses for selected outcomes. (The methodology and approach to these analyses are described in Chapter II, with more details in Appendix D.5. Appendix D.5 also includes figures depicting the growth curves that are reported in this chapter.) We undertook these analyses to take advantage of the longitudinal nature of some of the measures. Because growth curves required having the same measures administered at all three ages, these results are limited.[4] However, they do show change over time and allow us to conclude not only that Early Head Start programs produced impacts at particular points in time but that, in a few cases, altered the rate of change over time (indicated by a significant impact on the slopes of the curves). For child engagement of the parent and child sustained attention with objects, the group mean differences were significant at 2 and 3 years of age, as found in the overall impact analyses just described. The Early Head Start program experience did not alter the growth trends, however (that is, the program had no significant impact on slopes).

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[3] As described in Boxes V.1 and V.2, the measures of child behavior during the Bayley assessment are different kinds of measures than the Bayley MDI, a measure of child cognitive development discussed in the previous section, and on which we did find Early Head Start impacts.

[4] We were able to conduct these analyses for 3 child and 8 parent measures. The analytic technique limited us to measures that were the same at all three ages, were continuous variables (thus excluding binary and categorical variables), and were not age-normed (since these variables were adjusted for age at each point). Thus, unfortunately, it was not feasible to examine growth for the cognitive and language development outcomes. The sample for these analyses was further limited by the requirement that we could include only sample members who were administered the measures at all three ages. This may account for some differences in outcomes in the growth curve, compared with the point-in-time, impact estimates. For example, parent interview variables (such as parent-child play) were available for 2,110 families at 36 months whereas 1,700 families were interviewed at all three ages, a 19 percent smaller sample. Finally, these analyses produced linear growth curves, which in some cases may not accurately reflect the nature of the changes occurring over time.

In general, there was a broader pattern of favorable impacts on reducing negative aspects of children's social-emotional development at age 3 than at age 2. Early Head Start reduced two of the three negative measures of children's social-emotional development at age 3. The reduction in parent-reported aggressive behavior sustains the findings at age 2 and extends them to behavior in semistructured play with the parent (see Box V.3 and Table V.3). Similar to findings at age 2, Early Head Start children were reported by their parents as being less aggressive than control-group children.

At age 3, Early Head Start children also displayed less negativity toward their parents during semistructured play, an impact that did not appear at age 2 (Table V.3). The growth curve analysis of this outcome similarly showed no program impact on the change in negativity overtime—it declined at the same rate for both program and control children. Early Head Start had no impact on the level of child frustration during the parent-child puzzle challenge task at age 3, as rated by trained observers of videotaped parent-child interactions. This task was not administered at age 2.

As early aggressive behavior is predictive of later conduct problems (Moffitt et al.1996; and Dishion et al. 1995), these findings indicating less negativity toward the parent and less

BOX V.3

MEASURES OF NEGATIVE ASPECTS OF CHILD SOCIAL-EMOTIONAL DEVELOPMENT

Child Behavior During Parent-Child Semistructured Play – measures the child's behavior with the parent during a semistructured play task. The parent and child were given three bags of interesting toys and asked to play with the toys in sequence. The semistructured play task was videotaped, and child and parent behaviors were coded on a 7-point scale by child development researchers according to strict protocols (see Appendix C). This assessment was adapted for this evaluation from the Three Box coding scales used in the NICHD Study of Early Child Care (NICHD Early Child Care Research Network 1999). Three aspects of children's behavior with the parent were rated on a 7-point scale, with one reflecting a negative aspect of children's social-emotional development:

> ***Negativity Toward Parent*** – measures the degree to which the child shows anger, hostility, or dislike toward the parent. Expressions may be overt (for example, forcefully rejecting a toy offered by the parent or pushing the parent away) or covert (for example, hitting or throwing an object in response to the parent's behavior). Very high negativity receives a 7.

Child Behavior During Parent-Child Puzzle Challenge Task – measures the child's behavior with the parent during a puzzle completion task. The child was given a puzzle to play with, and the parent was instructed to give the child any help needed. After 3 minutes, or earlier if the puzzle was completed, the interviewer gave the child a second, harder puzzle and asked the mother not to help the child. If that puzzle was completed or 3 minutes elapsed, another, more challenging puzzle was provided. The puzzle challenge task was videotaped, and child and parent behaviors were coded on a 7-point scale by child development researchers according to strict protocols (see Appendix C). Three aspects of children's behavior with the parent were rated on a 7-point scale, with one reflecting a negative aspect of children's social-emotional development:

> ***Frustration with Task*** – measures the degree to which the child expresses frustration or anger toward the puzzle task, for example, by putting hands in lap, whining, pushing away puzzle pieces, crying about the puzzle, saying it is too hard, or throwing puzzle pieces. Very high frustration receives a 7.

Child Behavior Checklist – Aggressive Behavior – this subscale measures the incidence of 19 child behavior problems that tend to occur together and constitute aggressive behavior problems. Parents completed the Aggressive subscale of the Child Behavior Checklist for Ages 1 ½ to 5 Years (Achenbach and Rescorla 2000). Some behaviors asked about include, "Child has temper tantrums," "Child hits others," and "Child is easily frustrated." For each of the possible behavior problems, the parent was asked whether the child exhibits this behavior often, sometimes, or never. Scores range from 0, if all of the behavior problems are "never" observed by the parent, to 38, if all of the behavior problems are "often" observed.

TABLE V.3

IMPACTS ON NEGATIVE ASPECTS OF CHILD SOCIAL-EMOTIONAL DEVELOPMENT

Outcome	Program Group Participants[a]	Control Group[b]	Estimated Impact per Participant[c]	Effect Size[d]
Negativity Toward Parent During Parent-Child Semistructured Play[e]	1.2	1.3	-0.1**	-13.8
Frustration with Parent-Child Puzzle Challenge Task[f]	2.7	2.7	0.0	2.2
Child Behavior Checklist: Aggressive Behavior	10.6	11.3	-0.7**	-10.8
Sample Size				
Parent Interview	**1,107**	**1,003**	**2,110**	
Parent-Child Interactions	**875**	**784**	**1,659**	

SOURCE: Parent interviews and assessments of semistructured parent-child interactions conducted when children were approximately 36 months old.

NOTE: All impact estimates were calculated using regression models, where each site was weighted equally.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities.

[b] The control group mean is the mean for the control group members who would have participated in Early Head Start if they had been assigned to the program group instead. This unobserved mean was estimated as the difference between the program group mean for participants and the impact per participant.

[c] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for all program and control group members.

[d] The effect size was calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact expressed as a percentage of the standard deviation).

[e] Behaviors were observed during the videotaped parent-child semistructured play task and coded on a seven-point scale.

[f] Behaviors were observed during the videotaped parent-child puzzle challenge task and coded on a seven-point scale.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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aggressive behavior among Early Head Start children may enhance children's conduct and performance when they enter school.

D. OVERALL IMPACTS ON PARENTING

Early Head Start programs had favorable impacts on a broad range of parenting behavior, the home environment, and parenting knowledge. Overall, Early Head Start had favorable impacts on several aspects of emotional support for the child and support for language development and learning. Fewer impacts were found on negative aspects of parenting behavior, although there is evidence that the program reduced the use of punitive discipline.

1. Parenting Behavior and the Home Environment

This section discusses Early Head Start impacts on emotionally supportive parenting behavior, on measures of the parent's support for the child's language development and learning (including the overall measure of the emotional support and stimulation available in the home environment), and negative aspects of parenting behavior, including insensitivity, hostility, and punitive behavior.

a. Emotional Supportiveness

Early Head Start increased parents' emotional supportiveness toward their children, as rated by interviewer observations and through coding of behavior during videotaped, semistructured parent-child activities (see Box V.4 and Table V.4). Early Head Start parents exhibited more warmth towards their children during the parent interview session, as rated by the interviewer/assessor using a short subscale of the Home Observation for Measurement of the Environment (HOME) warmth subscale. This finding replicates the positive impact of Early Head Start on emotional responsivity, a similar subscale of the HOME for infants and toddlers, used when children were 2 years old. The positive impact of Early Head Start at age 2 on parent supportiveness observed during parent-child semistructured play was sustained at age 3: Early Head Start parents were rated as more supportive (warmer, more sensitive, and offering more cognitive stimulation) in play than parents in the control group. In the puzzle challenge situation, in which parents were instructed to give needed help as their child tried to complete a series of puzzles (see description in Box V.4), however, there was no significant program effect on emotionally supportive parenting. In other words, Early Head Start parents were no more likely than control parents to show support and enthusiasm for their child's work, or to display a positive attitude toward the child while the child attempted a complex activity that was challenging to complete (more so than the semistructured play task). This measure was not administered at age 2.

The group differences in parent supportiveness during the semistructured play task also are seen in the results of the growth curve analysis (see Appendix D.5). The growth curves indicate that this measure of supportiveness declined slightly over time, but the decline was the same for both groups of parents (that is, the program did not alter the rate of change). The observed decline for both groups may reflect parent provision of greater autonomy to their maturing, more capable children.

b. Support for Language and Learning

When children were 3 years old, Early Head Start had positive impacts on several aspects of parent support for language and learning and the overall quality of the home environment, continuing the pattern of impacts in this domain originally observed at age 2. These outcomes were measured by a variety of methods—parent report, interviewer observation, and coding by trained observers of videotaped parent-child interactions.

BOX V.4

MEASURES OF EMOTIONALLY SUPPORTIVE PARENTING

Home Observation for Measurement of the Environment (HOME) – measures the quality of stimulation and support available to a child in the home environment (Caldwell and Bradley 1984). At the 36-month assessment, we based our measure on the HOME-Short Form inventory, Preschool version, used in the National Longitudinal Survey of Youth (NLSY). Information needed to score the inventory is obtained through a combination of interview and observation conducted in the home with the child's parent while the child is present. A total of 37 items were used for the 36-month HOME scale in this study. In addition to a total score, we derived five subscales from this assessment, with one related to emotional support:

> ***Warmth*** – Measures responsive and supportive parenting behavior observed by the interviewer during the home visit. Items in this subscale are based entirely on interviewer observations of the parent and child during the interview, and include whether the mother kissed or caressed the child during the visit; whether her voice conveyed positive feeling, and whether she praised the child. Scores can range from 0, if none of the positive behaviors were observed, to 3, if all of the behaviors were observed.

Parent Behavior during Parent-Child Semistructured Play – measures the parent's behavior with the child during a semistructured play task. The parent and child were given three bags of interesting toys and asked to play with the toys in sequence. The semistructured play task was videotaped, and child and parent behaviors were coded by child development researchers according to strict protocols (see Appendix C). This assessment was adapted for this evaluation from the Three Box coding scales used in the NICHD Study of Early Child Care (NICHD Early Child Care Research Network 1999). Four aspects of the parent's behavior with the child were rated on a seven-point scale, with one aspect related to emotional support:

> ***Supportiveness*** – this composite measure is an average of parental sensitivity, cognitive stimulation, and positive regard during play with the child. *Sensitivity* includes such behavior as acknowledgement of the child's affect, vocalizations, and activity; facilitating the child's play; changing the pace of play when the child seems under-stimulated or over-excited; and demonstrating developmentally appropriate expectations of behavior. *Cognitive stimulation* involves taking advantage of the activities and toys to facilitate learning, development, and achievement; for example, by encouraging the child to talk about the materials, by encouraging play in ways that illustrate or teach concepts such as colors or sizes, and by using language to label the child's experiences or actions, to ask questions about the toys, to present activities in an organized series of steps, and to elaborate on the pictures in books or unique attributes of objects. *Positive regard* includes praising the child, smiling or laughing with the child, expressing affection, showing empathy for the child's distress, and showing clear enjoyment of the child.

Parent Behavior during Parent-Child Puzzle Challenge Task – measures the parent's behavior with the child during a puzzle completion task. The child was given a puzzle to play with, and the parent was instructed to give the child any help needed. After 3 minutes, or earlier if the puzzle was completed, the interviewer gave the child a second, harder puzzle and asked the mother not to help the child. If that puzzle was completed or 3 minutes elapsed, another, more challenging puzzle was provided. The puzzle challenge task was videotaped, and child and parent behaviors were coded on a 7-point scale by child development researchers according to strict protocols (see Appendix C). Four aspects of the parent's behavior with the child were rated on a 7-point scale, with one aspect related to emotional support:

> ***Supportive Presence*** – measures the parent's level of emotional support and enthusiasm toward the child and his or her work on the puzzles; displays of affection and a positive attitude toward the child and his or her abilities.

TABLE V.4

IMPACTS ON EMOTIONALLY SUPPORTIVE PARENTING

Outcome	Program Group Participants[a]	Control Group[b]	Estimated Impact per Participant[c]	Effect Size[d]
Home Observation for Measurement of the Environment (HOME): Warmth[e]	2.6	2.5	0.1*	9.0
Supportiveness During Parent-Child Semistructured Play[f]	4.0	3.9	0.1***	14.6
Supportive Presence During Parent-Child Puzzle Challenge Task[g]	4.5	4.4	0.1	4.2
Sample Size				
Parent Interview	**1,107**	**1,003**	**2,110**	
Parent-Child Interactions	**874**	**784**	**1,658**	

SOURCE: Parent interviews and assessments of semistructured parent-child interactions conducted when children were approximately 36 months old.

NOTE: All impact estimates were calculated using regression models, where each site was weighted equally.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities.

[b] The control group mean is the mean for the control group members who would have participated in Early Head Start if they had been assigned to the program group instead. This unobserved mean was estimated as the difference between the program group mean for participants and the impact per participant.

[c] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for all program and control group members.

[d] The effect size was calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact expressed as a percentage of the standard deviation).

[e] Behaviors were observed during the HOME assessment and rated on a yes/no scale by the interviewer/assessor.

[f] Behaviors were observed during the videotaped parent-child structured play task and coded on a seven-point scale. Supportiveness is a combination of Warm Sensitivity and Positive Regard.

[g] Behaviors were observed during the videotaped parent-child puzzle task and coded on a seven-point scale.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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Sustaining the impact found at age 2, the total HOME score was significantly higher for Early Head Start families than for control families, suggesting that overall, Early Head Start children live in home environments that provide more emotional support and cognitive stimulation (see Box V.5 and Table V.5).

Early Head Start programs did not have an impact on the internal physical environment of the home, an index derived from the HOME scale that measures the presence of home furnishings and decorations as well as cleanliness and orderliness. Families in both groups received relatively high scores on this measure (which ranges from 3 to 9) so impacts would likely have been difficult to accomplish.

More importantly, Early Head Start families scored higher on the subscale of the HOME that measures support of language and learning (Table V.5). Thus, Early Head Start improved the amount of cognitively stimulating toys and materials, along with the interactions that children experience in the home. This finding is consistent with impacts found at age 2 on a comparable subscale of the HOME.

In the videotaped parent-child puzzle challenge, Early Head Start parents provided higher quality of assistance to their children as well. This is one of the few puzzle challenge outcomes for which Early Head Start impacts paralleled those in the semistructured play situation. The parent-child puzzle challenge task was not administered at age 2.

Early Head Start parents reported engaging more frequently in a broader range of play activities with their children, a finding that was significant at age 2 and sustained at age 3.

Early Head Start impacts on regular reading to children were mixed at age 3. Similar to the findings at age 2, when children were 3, Early Head Start parents were more likely than control-group parents to report that they read daily to their children (57 percent of program-group parents compared with 52 percent of control-group parents). However, Early Head Start had no impact on the proportion of Early Head Start parents reporting reading to their children regularly at bedtime at age 3, although there had been a favorable program impact at age 2.[5] By age 3, 29 percent of control group families reported reading to their children at bedtime, a figure similar to the percentage of Early Head Start families who reported reading at bedtime at age 2, while 32 percent of program parents at age 3 reported reading at bedtime.

At age 3, we found no impact of Early Head Start on parents' structuring the child's day by keeping a regular bedtime and following regular bedtime routines. Nearly 60 percent of both program and control groups set a regular bedtime for their 3-year-old children, and nearly 70 percent followed regular bedtime routines. At age 2, the program had an impact on regular bedtimes but not on routines.

In general at age 3, Early Head Start parents provided more support for children's language development and learning than control parents by making efforts to teach colors, shapes, and numbers, by frequent reading to the child, telling stories, and singing songs, by providing more cognitive stimulation in interaction with the child, and by providing cognitively stimulating books, toys, games, and materials in the home. However, Early Head Start parents were not more likely than control parents to structure the child's day by setting a regular bedtime or following regular bedtime routines by age 3.

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[5] Differences in the way in which these reading outcomes were measured could account for the different percentages reporting regular reading. The daily reading variable was coded based on responses to a direct question about the frequency of reading. The frequency of daily reading could thus reflect both actual behavior and differences in the parent's knowledge that daily reading is desirable. Reading regularly at bedtime reflects parents' responses that they follow a regular bedtime routine and that the routine includes reading. While this outcome is not as likely to be influenced by social desirability biases, bedtime is not the only time of the day when reading can occur.

BOX V.5

MEASURES OF THE HOME ENVIRONMENT AND PARENT STIMULATION OF LANGUAGE AND LEARNING

Home Observation for Measurement of the Environment (HOME) – measures the quality of stimulation and support available to a child in the home environment (Caldwell and Bradley 1984). At the 36-month assessment, we based our measure on the HOME-Short Form inventory, Preschool version, used in the National Longitudinal Survey of Youth (NLSY). Information needed to score the inventory is obtained through a combination of interview and observation conducted in the home with the child's parent while the child is present. A total of 37 items were used for the 36-month HOME scale in this study. In addition to a total score, we derived five subscales from this assessment, with two related to the home environment and to stimulation of language and learning, as well as the Total Score:

> ***Total Score*** – measures the cognitive stimulation and emotional support provided by the parent in the home environment. The total includes all 37 items. The maximum potential score is 37.
>
> ***Support of Language and Learning*** – measures the breadth and quality of the mother's speech and verbal responses to the child during the home visit, as rated by the interviewer; whether the parent encourages the child to learn shapes, colors, numbers, and the alphabet; the presence of books, toys, and games accessible to the child; and whether the parent reads to the child several times per week. Items are obtained by a combination of parent report and interviewer observation. The maximum potential score is 13.
>
> ***Internal Physical Environment*** – measures the cleanliness, organization, and warmth of the home environment. Items in this subscale are based entirely on interviewer observations during the interview and were each coded on a 3-point scale for this subscale (but on a binary scale for the total HOME). Scores can range from 3 to 9.

Regular Bedtime – measures whether the parent has a regular bedtime for the child. The parent must name the time and report that the child went to bed at that time at least four of the past five weekdays.

Regular Bedtime Routines – measures whether the parent reports having a regular set of routines with the child around bedtime, such as singing lullabies, putting toys away, or telling stories.

Parent-Child Play – measures the frequency with which the parent engages in several activities with the child that can stimulate cognitive and language development, including reading or telling stories, dancing, singing, and playing outside together.

Read Every Day – measures whether the parent reported that she reads to the child "every day" or "more than once a day."

Read at Bedtime – measures whether the parent reported that the child has a regular bedtime routine and, in response to an open-ended question about activities that are part of that routine, the parent reported that reading is one of the routine activities.

Parent Behavior during Parent-Child Puzzle Challenge Task – measures the parent's behavior with the child during a puzzle completion task. The child was given a puzzle to play with, and the parent was instructed to give the child any help needed. After 3 minutes, or earlier if the puzzle was completed, the interviewer gave the child a second, harder puzzle and asked the mother not to help the child. If that puzzle was completed or 3 minutes elapsed, another, more challenging puzzle was provided. The puzzle challenge task was videotaped, and child and parent behaviors were coded on a 7-point scale by child development researchers according to strict protocols (see Appendix C). Four aspects of the parent's behavior with the child were rated on a 7-point scale, with one aspect related to emotional support:

> ***Quality of Assistance*** – measures the frequency and quality of clear guidance to the child, flexible strategies for providing assistance, and diverse, descriptive verbal instructions and exchanges with the child.

TABLE V.5

IMPACTS ON THE HOME ENVIRONMENT AND PARENT STIMULATION OF LANGUAGE AND LEARNING

Outcome	Program Group Participants[a]	Control Group[b]	Estimated Impact per Participant[c]	Effect Size[d]
Home Observation for Measurement of the Environment (HOME) – Total Score	27.6	27.0	0.5**	10.9
Structuring the Child's Day				
Percentage of Parents Who Set a Regular Bedtime for Child	59.4	58.2	1.3	2.5
Percentage of Parents and Children Who Have Regular Bedtime Routines	69.3	68.6	0.7	1.4
Parent-Child Activities and Learning Support				
HOME: Support of Language and Learning	10.6	10.4	0.2**	9.9
Parent-Child Play	4.4	4.3	0.1*	9.1
Quality of Assistance During Parent-Child Puzzle Challenge Task[e]	3.6	3.5	0.1*	9.0
Percentage of Parents Who Read to Child Every Day	56.8	52.0	4.9**	9.7
Percentage of Parents Who Regularly Read to Child at Bedtime	32.3	29.2	3.1	6.8
Internal Home Environment				
HOME: Internal Physical Environment	7.8	7.8	0.0	-0.3
Sample Size				
Parent Interview	**1,107**	**1,003**	**2,110**	
Parent-Child Interactions	**874**	**784**	**1,658**	

SOURCE: Parent interviews, interviewer observations, and assessments of semistructured parent-child interactions conducted when children were approximately 36 months old.

NOTE: All impact estimates were calculated using regression models, where each site was weighted equally.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities.

[b] The control group mean is the mean for the control group members who would have participated in Early Head Start if they had been assigned to the program group instead. This unobserved mean was estimated as the difference between the program group mean for participants and the impact per participant.

[c] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for all program and control group members.

[d] The effect size was calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact expressed as a percentage of the standard deviation).

[e] Behaviors were observed during the videotaped parent-child puzzle task and coded on a seven-point scale.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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c. Negative Aspects of Parenting Behavior

Continuing the pattern observed at age 2, Early Head Start had few impacts on insensitivity, hostility toward the child, and punishment at age 3 (see Box V.6 and Table V.6). Early Head Start parents were less detached in semistructured play than control-group parents, and the proportion of Early Head Start parents who reported spanking the child in the past week was lower than for control-group parents. There were no program effects on ratings of intrusiveness or negative regard toward the child in the semistructured play setting or on detachment or intrusiveness during the parent-child puzzle challenge task. In addition, there was no difference between Early Head Start and control-group families in the amount of harshness expressed toward the child during the parent interview (HOME harshness subscale), consistent with the findings at age 2. Average levels of insensitivity, hostility, and punitive behavior were relatively low among both program- and control-group parents.

The growth curve analyses for detachment, intrusiveness, and negative regard outcomes show similar patterns (see Appendix D.5). All three of these negative behaviors declined as children developed over the two-year period from approximately 1 to 3 years of age, and for the most part, impacts were not significant at any age. Control group parents were higher in detachment than program parents when children were 15 months, and their decrease over time was somewhat greater than was the program parents' decrease (that is, the programs' impact on slopes was significant). No impact on change was found for either intrusiveness or negative regard.

Early Head Start parents were less likely to report spanking during the previous week, sustaining a similar finding at age 2. The reported reduction in the use of physical punishment at ages 2 and 3 is consistent with findings discussed in the next section about Early Head Start impacts on parents' knowledge of discipline strategies.

2. Parenting Knowledge

Our assessment of parenting knowledge at age 3 was more limited than at age 2. Parenting knowledge is not always consistent with behavior. Therefore, in general, we focused the age 3 assessments on a broader range of child development outcomes and parenting behaviors than was true at age 2. It seemed likely that after two or three years of family enrollment, programs would expect behavioral changes to be emerging, and would place greater importance on them than on indicators of knowledge. We limited the measures of parenting knowledge to two important topics: safety practices with respect to child car seats and discipline strategies for common parent-child conflict situations.

Early Head Start had no impact on car seat safety practices, with about 70 percent of both program and control families reporting that they regularly used a car seat for their young children (see Box V.7 and Table V.7). At age 2, we also found no Early Head Start impacts on regular use of car seats.

In response to questions about how they would handle four common parent-child conflict situations (temper tantrums, playing with breakables, refusing to eat, and hitting the parent in anger), Early Head Start parents were less likely to report that they would physically punish their 3-year-old children or threaten physical punishment. At age 2, we found a similar reduction in physical punishment as a discipline strategy. However, in contrast to the findings at age 2, Early Head Start had no impact on the proportion of parents suggesting other discipline strategies, including positive discipline strategies, such as preventing certain situations, distracting the child, and talking to or explaining consequences to the child at age 3. The percentage of parents who suggested only mild discipline strategies (including all discipline strategies except shouting, threatening, or using physical punishment) was significantly higher among Early Head Start

BOX V.6

MEASURES OF NEGATIVE ASPECTS OF PARENTING BEHAVIOR

Parent Behavior during Parent-Child Semistructured Play – measures the parent's behavior with the child during a semistructured play task. The parent and child were given three bags of interesting toys and asked to play with the toys in sequence. The semistructured play task was videotaped, and child and parent behaviors were coded by child development researchers according to strict protocols (see Appendix C). Four aspects of the parent's behavior with the child were rated on a seven-point scale, with three related to negative parenting behavior:

> ***Detachment*** – measures the extent to which the parent is inattentive to the child, inconsistently attentive, or interacts with the child in an indifferent manner. For example, the parent may be inattentive, perfunctory, or cold when interacting with the child, may not respond to the child's talk or expressions, or may not try to engage the child with the new toys.
>
> ***Intrusiveness*** – measures the extent to which the parent exerts control over the child rather than acting in a way that recognizes and respects the validity of the child's perspective. Higher scores on intrusiveness indicate that the parent controlled the play agenda, not allowing the child to influence the focus or pace of play, grabbing toys away from the child, and not taking turns in play with the child.
>
> ***Negative Regard*** – measures the parent's expression of discontent with, anger toward, disapproval of, or rejection of the child. High scores on negative regard indicate that the parent used a disapproving or negative tone, showed frustration, anger, physical roughness, or harshness toward the child, threatened the child for failing at a task or not playing the way the parent desired, or belittled the child.

Parent Behavior during Parent-Child Puzzle Challenge Task – measures the parent's behavior with the child during a puzzle completion task. The child was given a puzzle to play with, and the parent was instructed to give the child any help needed. After 3 minutes, or earlier if the puzzle was completed, the interviewer gave the child a second, harder puzzle and asked the mother not to help the child. If that puzzle was completed or 3 minutes elapsed, another, more challenging puzzle was provided. The puzzle challenge task was videotaped, and child and parent behaviors were coded on a 7-point scale by child development researchers according to strict protocols (see Appendix C). Four aspects of the parent's behavior with the child were rated on a 7-point scale, with two related to negative parenting behavior:

> ***Detachment*** – measures the extent to which the parent is inattentive to the child, or interacts in a perfunctory or indifferent manner. For example, the parent may be inattentive, perfunctory, or cold when interacting with the child, may not respond to the child's talk or expressions, or may not try to engage the child with the new toys.
>
> ***Intrusiveness*** – measures the degree to which the parent controls the child rather than recognizing and respecting the validity of the child's independent efforts to solve the puzzle. For example, a parent behaving intrusively may complete the puzzle for the child or offer rapid, frequent instructions.

Home Observation for Measurement of the Environment (HOME) – measures the quality of stimulation and support available to a child in the home environment (Caldwell and Bradley 1984). At the 36-month assessment, we based our measure on the HOME-Short Form inventory, Preschool version, used in the National Longitudinal Survey of Youth (NLSY). Information needed to score the inventory is obtained through a combination of interview and observation conducted in the home with the child's parent while the child is present. A total of 37 items were used for the 36-month HOME scale in this study. In addition to a total score, we derived five subscales from this assessment, with one related to negative parenting:

> ***Harshness*** – measures harsh or punitive parenting behavior observed during the home interview. Items in this subscale are based entirely on interviewer observations of the parent and child during the interview, and include whether the parent scolded the child, physically restrained the child, or slapped or spanked the child. For this subscale (but not for the total HOME score), items were reverse-coded so that higher scores indicate more observed harsh behavior. Scores can range from 0, if no harsh behavior was observed, to 3, if the three types of harsh behavior were observed.

Spanked Child in Previous Week – measures parent's report that she used physical punishment in the previous week by spanking the child.

TABLE V.6

IMPACTS ON NEGATIVE ASPECTS OF PARENTING BEHAVIOR

Outcome	Program Group Participants[a]	Control Group[b]	Estimated Impact per Participant[c]	Effect Size[d]
Insensitivity				
Detachment During Parent-Child Semistructured Play[e]	1.2	1.3	-0.1*	-9.0
Intrusiveness During Parent-Child Semistructured Play[e]	1.6	1.6	0.0	-5.5
Detachment During Parent-Child Puzzle Challenge Task[f]	1.6	1.6	0.0	-0.2
Intrusiveness During Parent-Child Puzzle Challenge Task[f]	2.7	2.7	-0.1	-5.8
Hostility and Punishment				
Negative Regard During Parent-Child Semistructured Play[e]	1.3	1.3	0.0	-1.6
Home Observation for Measurement of the Environment (HOME): Harshness[g]	0.3	0.3	0.0	2.1
Percentage of Parents Who Spanked the Child During the Previous Week	46.7	53.8	-7.1***	-14.2
Sample Size				
Parent Interview	**1,107**	**1,003**	**2,110**	
Parent-Child Interactions	**874**	**784**	**1,658**	

SOURCE: Parent interviews, interviewer observations, and assessments of semistructured parent-child interactions conducted when children were approximately 36 months old.

NOTE: All impact estimates were calculated using regression models, where each site was weighted equally.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities.

[b] The control group mean is the mean for the control group members who would have participated in Early Head Start if they had been assigned to the program group instead. This unobserved mean was estimated as the difference between the program group mean for participants and the impact per participant.

[c] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for all program and control group members.

[d] The effect size was calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact expressed as a percentage of the standard deviation).

[e] Behaviors were observed during the videotaped parent-child semistructured play task and coded on a seven-point scale.

[f] Behaviors were observed during the videotaped parent-child puzzle challenge task and coded on a seven-point scale.

[g] Behaviors were observed during the HOME assessment and rated on a yes/no scale by the interviewer/assessor.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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BOX V.7

MEASURES OF PARENTING KNOWLEDGE ABOUT SAFETY AND DISCIPLINE STRATEGIES

Always Uses Car Seat for Child – measures whether the parent usually uses a car seat or booster seat when taking the child in a car, and whether the child usually sits in the back seat. The small proportion (6 percent) of parents who said they never use a car were coded as using safe practices for this measure.

Discipline Strategies – measures the parent's strategies for handling four different potential conflict situations with the child: (1) the child keeps playing with breakable things; (2) the child refuses to eat; (3) the child throws a temper tantrum in a public place; and (4) the child hits the parent in anger. Parents provided open-ended answers to how they would respond to each of the four situations, and these responses were classified into the types of discipline strategies, which were coded as binary variables. A parent received a "1" for each strategy that was ever mentioned. In addition, we created the following composite measures:

> ***Mild Discipline*** – binary variable indicates parents who mentioned only the following types of responses for each situation: prevent the situation; distract the child; remove the child or object; talk to the child or explain the issue; ignore the behavior; put the child in time out; send the child to his or her room; threaten to take away treats or threaten time out; or tell child "No."
>
> ***Index of Severity of Discipline Strategies*** – measures the degree of harshness of discipline strategies suggested. An individual's score on this index ranges from 1 to 5, and is determined by the harshest strategy that was suggested in response to any of the three conflict situations. Thus, parents who said they would use physical punishment receive a 5; those who did not suggest physical punishment but did say they would shout at the child receive a 4; those whose harshest response was to threaten the child with punishment receive a 3; those who suggest sending the child to his or her room, ignoring the behavior, threatening time out or loss of treats, or saying "No!" receive a 2; and those who suggested only preventing the situation or distracting the child, removing the child or object, talking to the child, or putting the child in time out receive a 1.

TABLE V.7

IMPACTS ON PARENTING KNOWLEDGE: SAFETY AND DISCIPLINE STRATEGIES

Outcome	Program Group Participants[a]	Control Group[b]	Estimated Impact per Participant[c]	Effect Size[d]
Safety Practices				
Percentage of Parents Who Always Use Car Seat for Child	69.8	70.8	-0.9	-2.0
Discipline Strategies				
Percentage of Parents Who Suggested Responses to the Hypothetical Situations with Child:				
Prevent or distract	70.6	69.3	1.3	2.8
Remove child or object	80.7	81.3	-0.5	-1.4
Talk and explain	70.7	69.1	1.7	3.6
Time out	27.0	26.9	0.2	0.3
Threaten or command	9.8	13.3	-3.5**	-10.3
Shout	8.7	8.3	0.4	1.4
Physical punishment	46.3	51.1	-4.8**	-9.6
Percentage of Parents Suggesting Only Mild Responses to the Hypothetical Situations[e]	44.7	40.5	4.2*	8.5
Index of Severity of Discipline Strategies Suggested[f]	3.4	3.5	-0.2**	-11.0
Sample Size	**1,107**	**1,003**	**2,110**	

SOURCE: Parent interviews conducted when children were approximately 36 months old.

NOTE: All impact estimates were calculated using regression models, where each site was weighted equally.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities.

[b] The control group mean is the mean for the control group members who would have participated in Early Head Start if they had been assigned to the program group instead. This unobserved mean was estimated as the difference between the program group mean for participants and the impact per participant.

[c] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for all program and control group members.

[d] The effect size was calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact expressed as a percentage of the standard deviation).

[e] Parents were classified as suggesting only mild discipline if their responses to the four discipline situations included only the following: prevent or distract, remove child or object, talk and explain, time out, ignore child, send the child to his or her room, threaten time out or loss of treats, or tell the child "No."

[f] The Index of Severity of Discipline Strategies is based on a hierarchy of discipline practices, from talk and explain, remove child or object, time out, or prevent/distract (1) through physical punishment (5). The most severe approach suggested is used to code this scale.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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parents. Similarly, the most severe discipline strategy mentioned tended to be more severe among control group than program families.

Overall, the pattern of findings suggests that Early Head Start parents were less likely to consider physical punishment as an appropriate response to hypothetical discipline situations, but the program did not significantly increase the proportion of parents suggesting more-positive discipline practices, as had been the case at age 2. When children were 3, a sizeable majority of both Early Head Start and control group parents specified more-positive techniques (for example, approximately 70 percent of parents suggested preventing the situation, distracting the child, or talking to the child and explaining consequences).

3. Summary of Impacts on Parenting

Early Head Start had significant impacts on several aspects of emotionally supportive parenting and support for children's language development and learning when children were 3 years old, measured in a variety of ways (parent self-report, interviewer observation, and structured coding of videotaped parent-child interactions). Early Head Start parents provided more-positive contexts for children's development through their more-emotionally supportive interactions (observed in the HOME and semistructured play), and cognitively stimulating interactions (including cognitively stimulating assistance in the puzzle challenge, increased incidence of daily parent-child reading and play activities, and the availability of cognitively stimulating toys and materials and interactions as observed in the HOME language and learning scale).

The program had fewer impacts on insensitivity and hostility, but appears to have reduced the use of physical punishment. Early Head Start parents showed less observed detachment during the videotaped semistructured play task, were less likely to report spanking in the previous week, and were less likely to suggest physical punishment as a response to hypothetical discipline situations.

Some domains of parenting were not significantly affected by participation in Early Head Start, including (1) structuring the child's day by having a consistent bedtime and bedtime routine (over 40 percent of children in both groups did not have a regular bedtime); (2) structuring of the internal physical environment (both groups averaged 7.8 out of 9 possible points, suggesting that both had reasonably organized home environments); (3) regular use of child car safety seats (about 70 percent in both groups); (4) use of positive hypothetical discipline strategies in response to parent-child conflict; and (5) several aspects of insensitivity and hostility toward the child during semi-structured parent-child tasks, and observed harshness during the home interview, which were low on average for parents in both the program and control groups.

Overall, the pattern of impacts on parenting when children were 3 years old was generally very consistent with the pattern of impacts found when children were 2 years old. Moreover, the results suggest that Early Head Start was successful in influencing some of the major categories of parenting that are important for children's well-being and school readiness. Early Head Start parents were more emotionally supportive, were more likely to read regularly to their children, provided more stimulating home environments, and were less likely to use physical punishment (both actual and hypothetical).

E. OVERALL IMPACTS ON FAMILY WELL-BEING

1. Parents' Health and Mental Health and Family Functioning

The relatively high level of health services available in communities and the absence of program impacts on receipt of family health services lead us not to expect impacts of Early Head Start on parents' physical health. We also expected small or no impacts on mental health and family functioning because infant and parent mental health services were often lacking in the communities and because the programs did not have a significant impact on the receipt of parent mental health services. Nevertheless, we examined these outcomes because of their importance to the parent's ability to function as a parent and provider.

Early Head Start had no impact on parents' reported levels of health status, mental health, parenting stress, or family conflict at the time children were 3 years old. Favorable impacts on parenting-related stress and negative feelings and on family conflict measured when children were 2 years old did not persist a year later (see Box V.8 and Table V.8). In growth curve analyses, we see that levels of parental distress declined at about the same rates for both program and control parents, although the program group levels were consistently lower than those of the control group (Appendix D.5).

The program had no impact on reported levels of parent-child dysfunctional interaction (Table V.8). At age 3, there were no overall impacts on family conflict, although favorable impacts were found at age 2 (a difference perhaps due to the somewhat different sample included in the growth curve analysis). Growth curve analysis showed an interesting pattern that did not emerge in any of the other outcomes that we could examine over time: Family conflict declined for the program group, while staying about the same across time for the control parents (see Appendix D.5). The difference in the two slopes (rates of change over time) was statistically significant, indicating that family conflict declined at a somewhat faster rate for the program than for the control group.

2. Economic Self-Sufficiency

Early Head Start had favorable impacts on the level of self-sufficiency activities of parents, measured as the proportion ever engaging in the activity in the eight quarters after enrollment in Early Head Start, or in the average hours per week that they engaged in the activity (see Box V.9

and Table V.9). Participation rates in any activity (education, job training, or employment) were higher for parents in the program group than for those in the control group in the third through eighth quarters after enrollment (Figure V.1).

Impacts on education activities were larger than impacts on employment activities. A larger proportion of parents in the program group participated in education or job training activities in the third through eighth quarters after enrollment (Figure V.2). Approximately 20 to 30 percent of Early Head Start parents participated in education or training activities in any quarter, but over the eight quarters, 60 percent of Early Head Start parents participated in an education or training activity (Table V.9).

The overall education impacts generally reflected an increase in high school attendance. No significant impacts were found overall in rates of attendance in other educational programs. Given the persistent impact on high school attendance at 15 months and 26 months after enrollment, we expected to find an impact on the highest grade completed, GED certificate or high school diploma by 26 months after enrollment, but there were no impacts of Early Head Start on attainment of these credentials (Table V.10).

Employment rates were much higher than the percentage in education or training activities. Overall, more than 85 percent of Early Head Start parents were employed at some point during the 26-month follow-up period (see again, Table V.9), while on a quarterly basis, employment rates increased from about 40 percent to 65 percent (Figure V.3). Nevertheless, employment rates seemed to be responding to the strong economy and welfare policies encouraging work rather than the influence of Early Head Start, since employment rates for the program and control groups were not statistically different in seven out of eight quarters after enrollment.

BOX V.8

MEASURES OF THE PARENT'S HEALTH, MENTAL HEALTH, AND FAMILY FUNCTIONING

Health Status – measures the parent's perception of own health status on a 5-point scale, where 1 indicates poor health and 5 indicates excellent health.

Parenting Stress Index – Short Form (PSI-SF) – measures the degree of stress in parent-child relationships stemming from three possible sources: the child's challenging temperament, parental depression, and negatively reinforcing parent-child interactions (Abidin 1995). We included two subscales of the PSI-SF:

> ***Parental Distress*** – measures the level of distress the parent is feeling in his or her role as a parent stemming from personal factors, including a low sense of competence as a parent, stress because of perceived restrictions stemming from parenting, depression, and lack of social support.
>
> The parent answers whether he or she agrees or disagrees with statements such as, "You often have the feeling that you cannot handle things very well," and "You feel trapped by your responsibilities as a parent," and "You feel alone and without friends." Item responses are coded on a 5-point scale, with 5 indicating high levels of parental distress. Scores on the 12-item subscale can range from 12 to 60.
>
> ***Parent-Child Dysfunctional Interaction*** – measures the parent's perception that the child does not meet the parent's expectations and interactions with the child are not reinforcing the parent. The parent may perceive that the child is abusing or rejecting the parent or that the parent feels disappointed in or alienated from the child.
>
> The parent answers whether he or she agrees or disagrees with statements such as, "Your child rarely does things for you that make you feel good," and "Most times you feel that your child does not like you and does not want to be close to you," and "Your child seems to smile less than most children." Item responses are coded on a 5-point scale, with 5 indicating high levels of parent-child dysfunctional interaction. Scores on the 12-item subscale can range from 12 to 60.

Center for Epidemiological Studies Depression Scale – Short Form (CESD-SF) – measures symptoms of depression (Ross et al. 1983). It does not indicate a diagnosis of clinical depression, but it does discriminate between depressed patients and others. The scale includes 12 items taken from the full, 20-item CESD scale (Radloff 1977). Respondents were asked the number of days in the past week they had a particular symptom. Symptoms include poor appetite, restless sleep, loneliness, sadness, and lack of energy. Items coded on a four-point scale from rarely (0) to most days (3). Scores on the scale range from 0 to 36.

> ***Severe Depressive Symptoms*** – percentage of parents whose scores on the CESD-SF were 15 or higher. This corresponds to a score of 25 or higher on the full CES-D, which is used to indicate high levels of depressive symptoms (Seligman 1993).

Family Environment Scale – measures the social environments of families along 10 key dimensions, including family relationships (cohesion, expressiveness, and conflict); emphases within the family on aspects of personal development that can be supported by families (for example, achievement orientation; independence); and maintenance of the family system (organization and control) (Moos and Moos 1976). We measured one dimension:

> ***Family Conflict*** – measures the extent to which the open expression of anger and aggression and generally conflictual interactions are characteristic of the family. Parents respond to items on a 4-point scale, where 4 indicates higher levels of agreement with statements such as, "We fight a lot," and "We hardly ever lose our tempers." Items were recoded and averaged so that 4 indicates high levels of conflict.

TABLE V.8

IMPACTS ON PARENT HEALTH, MENTAL HEALTH, AND FAMILY FUNCTIONING

Outcome	Program Group Participants[a]	Control Group[b]	Estimated Impact per Participant[c]	Effect Size[d]
Parent's Physical Health				
Parent's Health Status	3.4	3.5	-0.1	-4.9
Parent's Mental Health				
Parenting Stress Index (PSI): Parental Distress	24.7	25.5	-0.7	-7.7
PSI: Parent-Child Dysfunctional Interaction	17.8	17.8	0.0	-0.2
CES-Depression Scale (CES-D; short form)	7.4	7.7	-0.3	-3.7
CES-D: Severe Depressive Symptoms	14.5	14.8	-0.3	-0.8
Family Functioning				
Family Environment Scale–Family Conflict (Average Score)	1.7	1.7	0.0	-4.3
Sample Size	**1,107**	**1,003**	**2,110**	

SOURCE: Parent interviews conducted when children were approximately 36 months old.

NOTE: All impact estimates were calculated using regression models, where each site was weighted equally.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities.

[b] The control group mean is the mean for the control group members who would have participated in Early Head Start if they had been assigned to the program group instead. This unobserved mean was estimated as the difference between the program group mean for participants and the impact per participant.

[c] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for all program and control group members.

[d] The effect size was calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact expressed as a percentage of the standard deviation).

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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BOX V.9

MEASURES OF ECONOMIC SELF-SUFFICIENCY

Education - Parents were asked about education and job training programs that they had participated in during the follow-up period, including the start and end dates for those activities and the typical hours per day and days per week they spent in those activities. From that information we constructed a weekly timeline of education/training activities and indicators of whether parents were in education/training activities during each of the first five quarters following random assignment. We also combined information on hours per day and days per week for all education/training activities to obtain the average hours per week parents spent in education/training activities during the 24-month follow-up period. Averages include zero hours.

Employment - Parents were asked about jobs that they had held during the follow-up period, including the start and end dates for those jobs and the typical hours per week they worked in those jobs. From that information we constructed a weekly timeline of employment activities and indicators of whether parents were employed during the first five quarters following random assignment. We also combined information on hours per day and days per week for all jobs to obtain the average hours per week parents spent in employment during the 24-month follow-up period. Averages include zero hours.

Any Activity - The weekly histories of education/training activities and jobs were combined to create a timeline of participation in any of these self-sufficiency activities and indicators of whether parents participated in any self-sufficiency activities during each of the first five quarters following random assignment. We also added the average number of hours spent in education/training and jobs to get the average number of hours parents spent in any self-sufficiency activities during the first 24 months after random assignment. Averages include zero hours.

Welfare Program Participation - Parents were asked about their receipt of AFDC/TANF cash assistance, food stamps, general assistance, and SSI or SSA benefits, including the amount they received and the months during which they received it. From this information we created a monthly timeline of welfare receipt and a timeline of AFDC/TANF cash assistance receipt, as well as indicators of welfare receipt and AFDC/TANF cash assistance receipt during each of the first five quarters after random assignment. We also added the welfare benefit amounts to obtain the total amount of welfare benefits received, the total amount of food stamps received, and the total amount of AFDC/TANF cash assistance received during the 24-month follow-up period. Averages include zero benefit amounts.

Family Income and Resources - In the Parent Services Follow-Up Interviews, parents were asked about their family income during the last year. We compared information on their annual income and the number of children in their family with federal poverty levels to create an indicator of whether or not the family's income during the year prior to the third follow-up was above the poverty level or not. Family resources were assessed using the Family Resource Scale (Dunst and Leet 1987) plus items assessing additional resources, in which parents rated the adequacy of 39 specific resources on a scale of 1 (not at all adequate) to 5 (almost always adequate). The item values were summed to obtain a total family resources scale value.

Subsequent Childbearing - In the Parent Services Follow-Up Interviews, parents were asked whether they had borne any children since the previous interview and if so, the birth dates. We used this information to create an indicator of whether the parent had any births and the timing of the births since the enrollment date. For mothers who entered the program in pregnancy, the birth of the focus child is excluded from these counts.

TABLE V.9

IMPACTS ON SELF-SUFFICIENCY ACTIVITIES

Outcome	Program Group Participants[a]	Control Group[b]	Estimated Impact per Participant[c]	Effect Size[d]
Any Self-Sufficiency Activities				
Percentage of Parents Ever Employed or in an Education or Job-Training Program in First 26 Months	93.9	90.5	3.4**	11.1
Average Hours per Week Employed at All Jobs and in Any Education or Training in First 26 Months	22.3	20.9	1.5*	9.3
Employment Activities				
Percentage of Parents Ever Employed in First 26 Months	86.8	83.4	3.4*	9.0
Average Hours per Week Employed at All Jobs in First 26 Months	17.1	17.1	0.1	0.5
Education Activities				
Percentage of Parents Who Ever Participated in an Education or Training Program in First 26 Months	60.0	51.4	8.6***	17.2
Average Hours per Week in an Education Program During First 26 Months	4.6	3.4	1.2***	18.4
Sample Size	**1,139**	**1,097**	**2,236**	

SOURCE: Parent services follow-up interviews conducted an average of 26 months after random assignment.

NOTE: All impact estimates were calculated using regression models, where each site was weighted equally.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities.

[b] The control group mean is the mean for the control group members who would have participated in Early Head Start if they had been assigned to the program group instead. This unobserved mean was estimated as the difference between the program group mean for participants and the impact per participant.

[c] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for all program and control group members.

[d] The effect size was calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact expressed as a percentage of the standard deviation).

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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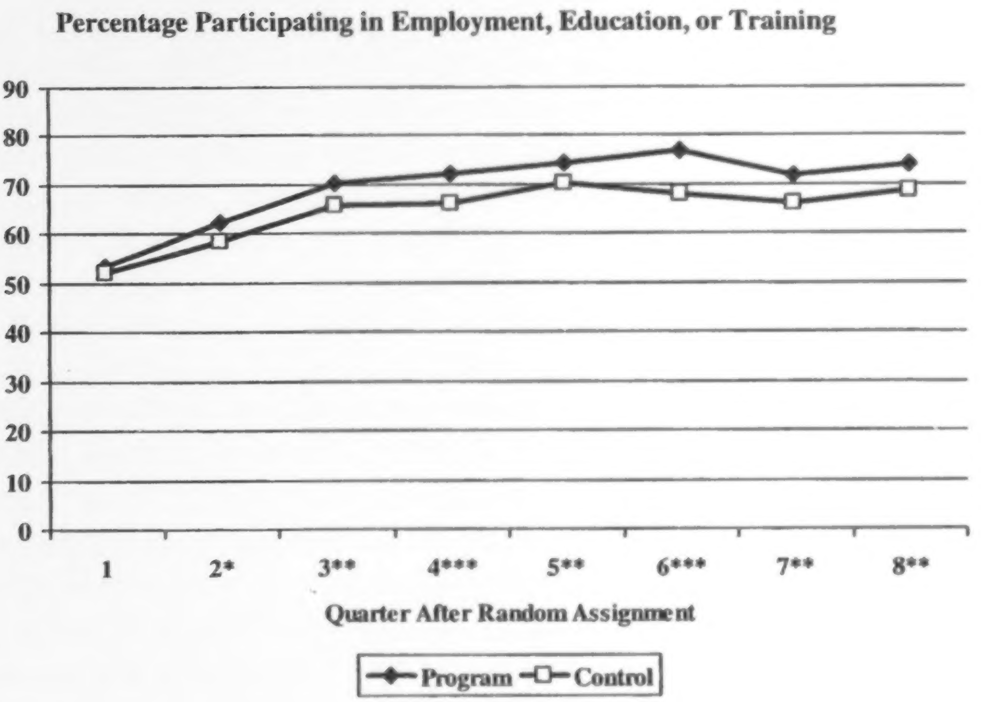
FIGURE V.1

IMPACTS ON ANY SELF-SUFFICIENCY ACTIVITY, BY QUARTER



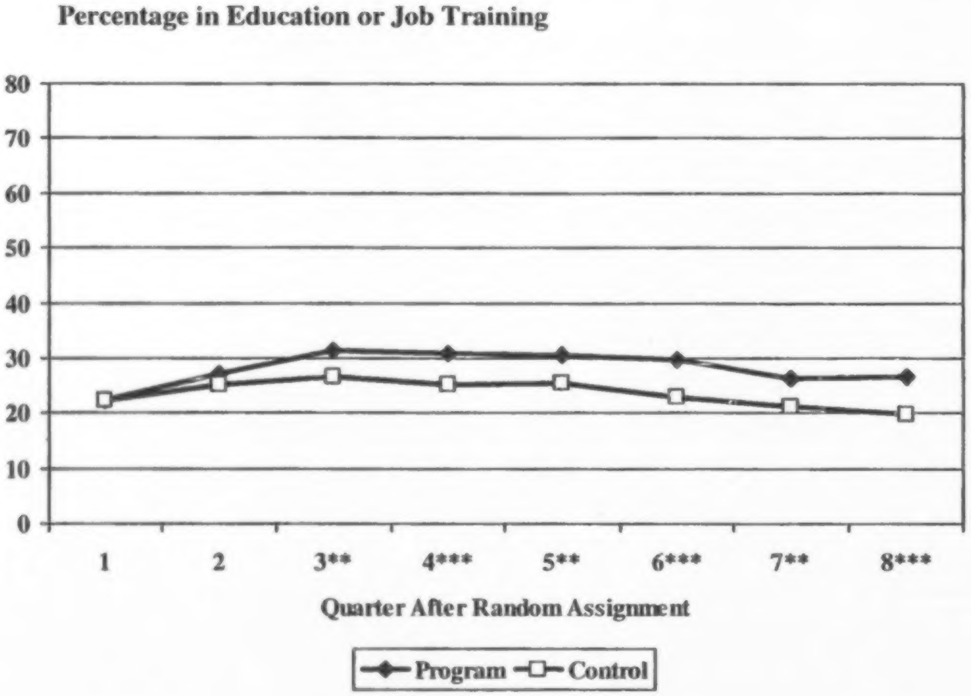
Source: Parent Services Follow-Up Interviews conducted approximately 7, 16, and 26 months after random assignment.

Notes: All percentages are regression-adjusted means estimated using models that weight each site equally. The differences between program and control families are estimated impacts per participant.

* Program impact is significantly different from zero at the .10 level, two-tailed test.
** Program impact is significantly different from zero at the .05 level, two-tailed test.
***Program impact is significantly different from zero at the .01 level, two-tailed test.

FIGURE V. 2

IMPACTS ON PARTICIPATION IN EDUCATION AND TRAINING PROGRAMS, BY QUARTER



Source: Parent Services Follow-Up Interviews conducted approximately 7, 16, and 26 months after random assignment.

Notes: All percentages are regression-adjusted means estimated using models that weight each site equally. The differences between program and control families are estimated impacts per participant.

* Program impact is significantly different from zero at the .10 level, two-tailed test.
** Program impact is significantly different from zero at the .05 level, two-tailed test.
***Program impact is significantly different from zero at the .01 level, two-tailed test.

TABLE V.10

IMPACTS ON EDUCATION ACTIVITIES AND CREDENTIALS

Outcome	Program Group Participants[a]	Control Group[b]	Estimated Impact per Participant[c]	Effect Size[d]
Types of Education Activities				
High School	13.6	9.0	4.6***	16.2
High School or Alternative	14.3	10.3	4.0***	13.2
Adult Basic Education	4.3	3.7	0.7	3.7
English as a Second Language	3.5	2.5	1.0	7.0
GED Preparation	9.8	8.5	1.3	4.6
Any Vocational Education	20.0	17.3	2.7	7.3
Two-Year College	10.9	10.4	0.5	1.8
Four-Year College	6.4	6.1	0.3	1.5
Degrees and Credentials Received				
Highest Grade Completed at Second Followup	11.6	11.6	-0.1	-3.0
GED Certificate	10.0	11.1	-1.1	-3.5
High School Diploma	50.3	49.5	0.8	1.6
Vocational, Business, or Secretarial Diploma	17.6	17.4	0.2	0.6
Associate's Degree	3.6	4.8	-1.2	-6.0
Bachelor's Degree	4.4	5.9	-1.6	-7.1
Sample Size	**1,139**	**1,097**	**2,236**	

SOURCE: Parent services follow-up interviews completed an average of 26 months after random assignment.

NOTE: All impact estimates were calculated using regression models, where each site was weighted equally.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities.

[b] The control group mean is the mean for the control group members who would have participated in Early Head Start if they had been assigned to the program group instead. This unobserved mean was estimated as the difference between the program group mean for participants and the impact per participant.

[c] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for all program and control group members.

[d] The effect size was calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact expressed as a percentage of the standard deviation).

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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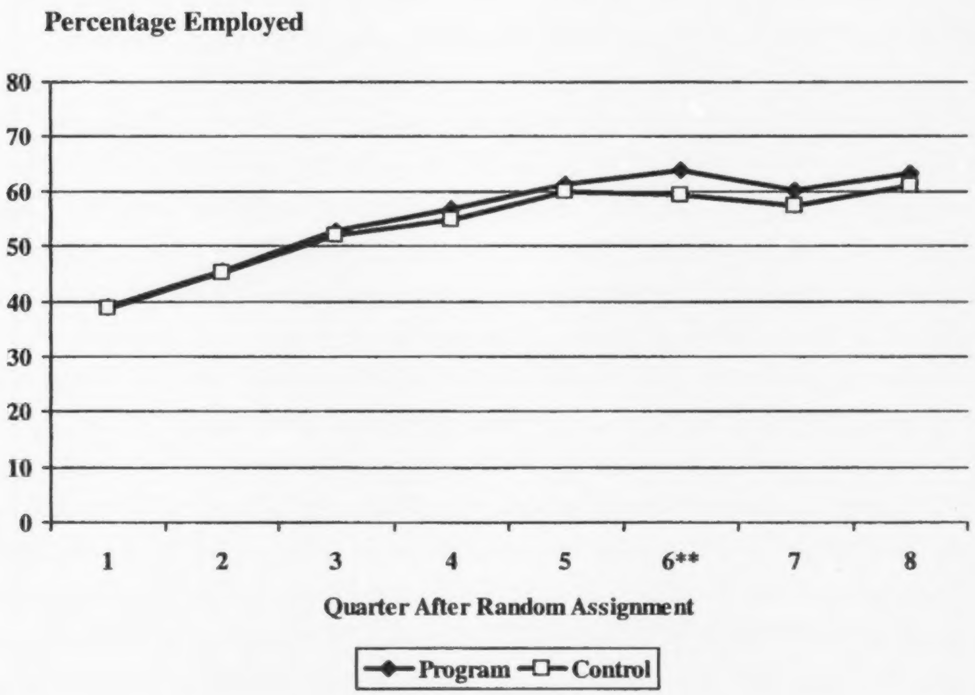
FIGURE V.3

IMPACTS ON EMPLOYMENT RATES, BY QUARTER



Source: Parent Services Follow-Up Interviews conducted approximately 7, 16, and 26 months after random assignment.

Notes: All percentages are regression-adjusted means estimated using models that weight each site equally. The differences between program and control families are estimated impacts per participant.

* Program impact is significantly different from zero at the .10 level, two-tailed test.
** Program impact is significantly different from zero at the .05 level, two-tailed test.
***Program impact is significantly different from zero at the .01 level, two-tailed test.

Consistent with the employment findings, welfare receipt went down for both program and control group families over time, but Early Head Start had no impact on receipt of welfare or the amount of welfare benefits received over the 26-month period after enrollment (Table V.11, Figure V.4). Early Head Start had no impact on the percentage of families with income above the poverty line at 26 months after enrollment (Table V.12).

Early Head Start mothers were somewhat less likely than control mothers to experience subsequent births during the first two years after they enrolled (Table V.12). In addition, Figure V.5 shows that in quarters 6, 7, and 8 after enrollment, the percentage of program mothers who had given birth to a child other than the focus child since enrollment was significantly lower than the percentage of control group mothers. This delay in subsequent births may have implications for parents' progress toward self-sufficiency and mental health, as shorter intervals between births can negatively affect parents' well-being and make it more difficult for them to engage in self-sufficiency activities.

F. HOW IMPACTS ON PARENTING AT AGE 2 MAY HAVE INFLUENCED CHILD OUTCOMES AT AGE 3

Many of the Early Head Start programs believed that an important route to enhancing children's well-being was to support a strong parent-child relationship. Thus, these programs hoped that impacts on parenting behavior would, over time, yield benefits for children's cognitive and social-emotional development. To explore how this theory of change might be working during the three years of the evaluation, we conducted analyses that examined the association between child impacts measured at the time of the child's 36-month birthday and parenting impacts measured a year earlier. These "mediated" analyses controlled for many demographic characteristics that could also affect the size of the impacts, yet must be interpreted

TABLE V.11

IMPACTS ON WELFARE PROGRAM PARTICIPATION

Outcome	Program Group Participants[a]	Control Group[b]	Estimated Impact per Participant[c]	Effect Size[d]
Welfare Program Participation				
Percentage of Parents Who Received Any Welfare Benefits During First 26 Months	68.1	66.5	1.6	3.5
Total Welfare Benefits Received During First 26 Months	$5,287	$5,548	-$261	-3.5
Percentage of Parents Who Received AFDC or TANF Benefits During First 26 Months	47.0	44.7	2.3	4.6
Total AFDC or TANF Benefits Received During First 26 Months	$2,142	$2,160	-$19	-0.5
Average Total Food Stamp Benefits Received During First 26 Months	$2,110	$2,079	$30	1.1
Sample Size	**1,139**	**1,097**	**2,236**	

SOURCE: Parent services follow-up interviews conducted an average of 26 months after random assignment.

NOTE: All impact estimates were calculated using regression models, where each site was weighted equally.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities.

[b] The control group mean is the mean for the control group members who would have participated in Early Head Start if they had been assigned to the program group instead. This unobserved mean was estimated as the difference between the program group mean for participants and the impact per participant.

[c] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for all program and control group members.

[d] The effect size was calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact expressed as a percentage of the standard deviation).

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

AFDC = Aid to Families with Dependent Children; TANF = Temporary Assistance for Needy Families.

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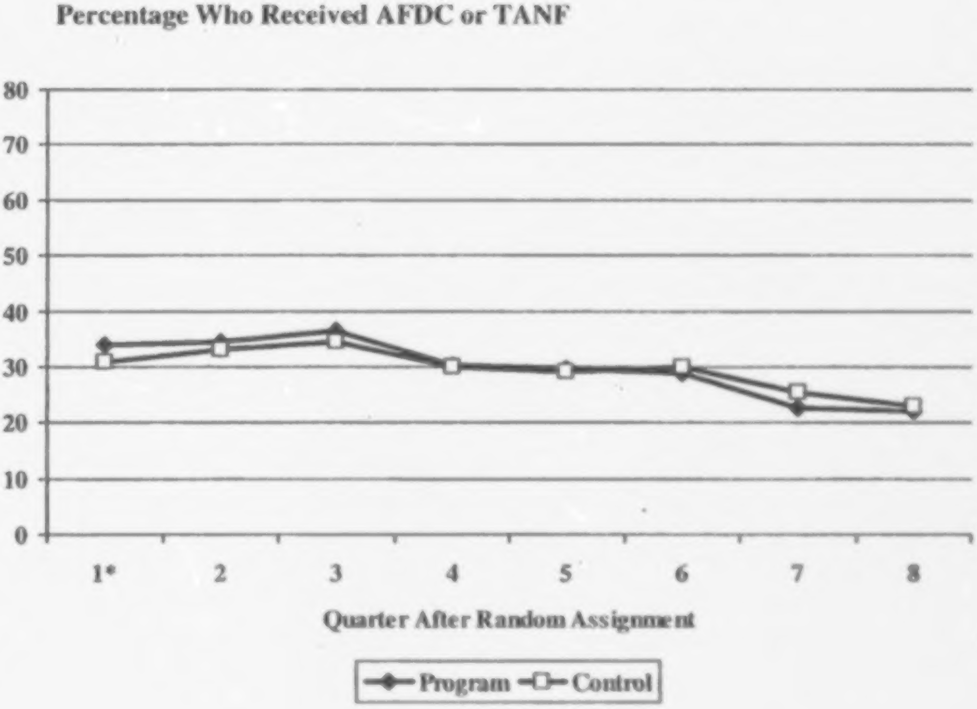
FIGURE V.4

IMPACTS ON AFDC/TANF RECEIPT, BY QUARTER



Source: Parent Services Follow-Up Interviews conducted approximately 7, 16, and 26 months after random assignment.

Notes: All percentages are regression-adjusted means estimated using models that weight each site equally. The differences between program and control families are estimated impacts per participant.

* Program impact is significantly different from zero at the .10 level, two-tailed test.
** Program impact is significantly different from zero at the .05 level, two-tailed test.
***Program impact is significantly different from zero at the .01 level, two-tailed test.

TABLE V.12

IMPACTS ON FAMILY INCOME, RESOURCES, AND SUBSEQUENT CHILDBEARING

Outcome	Program Group Participants[a]	Control Group[b]	Estimated Impact Per Participant[c]	Effect Size[d]
Percentage of Families with Income Above the Poverty Line at Third Followup	42.9	43.3	-0.4	-0.8
Total Family Resources Scale				
First Followup	149.6	148.7	0.9	4.4
Second Followup	152.9	151.6	1.3	6.7
Third Followup	154.8	153.8	1.0	5.2
Percentage with Any Births (Not Including Focus Child) Within 24 Months After Random Assignment[e]	22.9	27.1	-4.2*	-9.2
Average Number of Births (Not Including Focus Child)[e]	0.3	0.3	-0.0	-6.1
Sample Size	**918 - 1,139**	**857 - 1,097**	**1,775 - 2,236**	

SOURCE: Parent services follow-up interviews completed an average of 26 months after random assignment.

NOTE: All impact estimates were calculated using regression models, where each site was weighted equally.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities.

[b] The control group mean is the mean for the control group members who would have participated in Early Head Start if they had been assigned to the program group instead. This unobserved mean was estimated as the difference between the program group mean for participants and the impact per participant.

[c] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for all program and control group members.

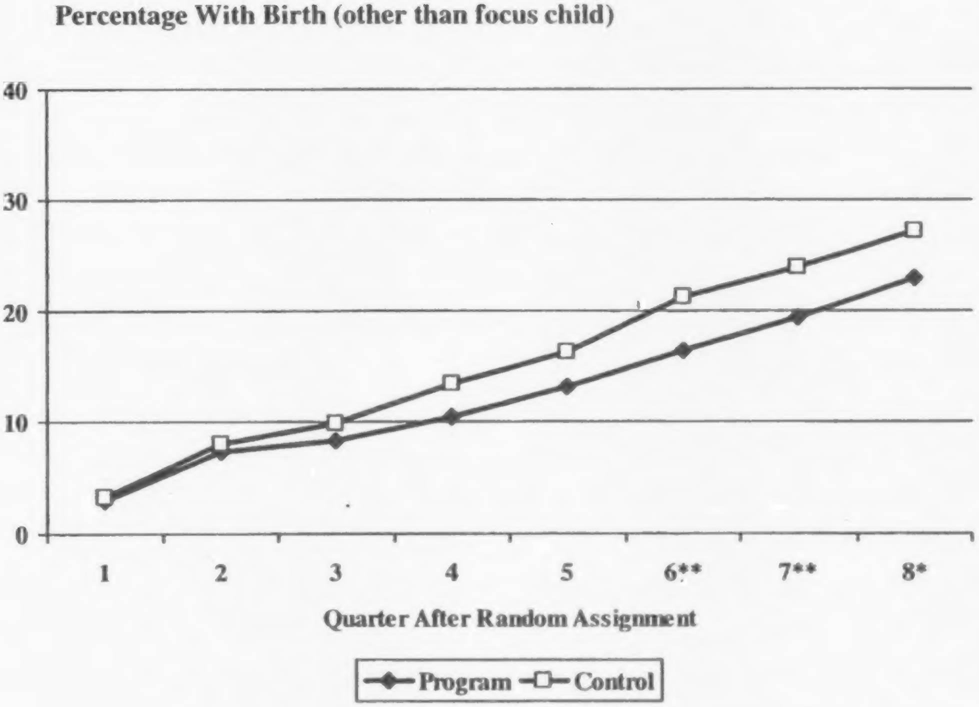
[d] The effect size was calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact expressed as a percentage of the standard deviation).

[e] Length of followup varies among sample members but is the same for program and control group members.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

FIGURE V.5

IMPACTS ON SUBSEQUENT BIRTHS, BY QUARTER



Source: Parent Services Follow-Up Interviews conducted approximately 7, 16, and 26 months after random assignment.

Notes: All percentages are regression-adjusted means estimated using models that weight each site equally. The differences between program and control families are estimated impacts per participant.

* Program impact is significantly different from zero at the .10 level, two-tailed test.
** Program impact is significantly different from zero at the .05 level, two-tailed test.
***Program impact is significantly different from zero at the .01 level, two-tailed test.

with caution because of possible uncontrolled confounding and simultaneity (see Chapter II and Appendix D.9 for details on the design and results of these analyses). Specifically, we developed the following hypotheses as we developed the statistical models for the mediated analyses:

- Several aspects of parenting measured when the children were 2 years old are likely to support and stimulate children's cognitive and language development. Thus, 2-year impacts on parent supportiveness, cognitive stimulation during parent-child play, and support for language and learning, as well as parents' reading every day may at least partially mediate impacts on the Bayley MDI and the PPVT-III at age 3.

- How parents interact with their children is likely to affect how the children respond to them. When parents display greater warm sensitivity, emotional responsivity, and support for language and learning when their children are 2, their children may be more likely to initiate and maintain higher levels of interaction (engagement) with their parents in the play situation when children are a year older. Similarly, if parents act more detached, children may show lower levels of engagement.

- When children were 2, if their parents behaved in ways that supported language and learning, had greater knowledge of child development, and felt more confident in their role as parent (that is, had lower levels of parenting distress), these children might be expected to be better able to focus while playing with objects (that is, show higher sustained attention).

- Parent discipline styles often are considered to be important mediators of many aspects of children's behavior and development. The literature suggests an association between physical punishment and aggressive behavior in children. We therefore hypothesized that when the program has an impact on reducing parent spanking at age 2, children will show lower levels of aggressive behavior when they are 3. Other aspects of parenting that are likely to be associated with lower aggressiveness at age 3 include a stable and warm home atmosphere, which could be reflected in parents providing regular bedtimes, being warm and supportive, and having lower levels of parenting distress at age 2.

- Finally, we hypothesize that the favorable 2-year impacts on parents' spanking, parental distress, intrusiveness, and warm sensitivity (that is, lower levels of spanking, distress, and intrusiveness and increased warm sensitivity) will be associated with lower levels of children's negativity toward their parents when they are 3.

Table V.13 summarizes the results of mediated analyses for the full sample.[6] The shaded rows indicate the 3-year-old child impacts for which we tested mediated models that included, as mediators, the 2-year parenting outcomes that are listed in the first column.

1. Mediators of Cognitive and Language Development

Our analyses suggest that Early Head Start programs may have produced some of their impacts on children at 3 years of age through the impacts on parenting a year earlier. These analyses indicate that children's scores on the Bayley MDI at 36 months were related to higher levels of parent supportiveness in semistructured play, greater support for cognitive and language development, and daily reading at 2 years of age. In total, the estimates suggest support for the hypothesis that some of the Early Head Start impact on children's cognitive development could have occurred because of the program's impacts on parents' sensitivity and cognitive stimulation in interactions with the child, and their support in the home for the child's cognitive and language development.[7]

Estimates also suggest a positive relationship between 36-month PPVT III scores and parent supportiveness in play and support for cognitive and language development. In total, these estimates suggest that part of the Early Head Start impact on children's receptive language ability at 3 years of age could have emerged because of earlier impacts on the parent's

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[6] Appendix D.9 provides greater detail on our hypotheses and the rationale for these analyses, and also includes mediated analyses by program approach, as discussed in Chapter VI.

[7] To check the robustness of these findings, we also substituted an alternative measure of the frequency of parent reading to the child for reading at bedtime. The alternative variable, Daily Reading, is based on parent report in response to a direct question about how often the parent reads to the child. We found that the proportion of the impact on the Bayley MDI and PPVT-III at 36 months that is associated with daily reading is very similar to the proportion associated with reading at bedtime, and the overall proportion of the impact associated with all of the parenting mediators in each of the models changes by only about 3 percentage points.

TABLE V.13

ESTIMATED MEDIATING EFFECTS OF PARENTING IMPACTS AT AGE 2 ON EARLY HEAD START IMPACTS ON CHILD DEVELOPMENT AT AGE 3

Parenting Outcome	Estimated Effect of Parenting Outcome on Child Outcome[a]	Significance Level	Percentage of Impact on Child Outcome Associated With Earlier Impact on Mediator[b]
36-Month Bayley MDI			
Supportiveness: Semistructured Play	+	***	Moderate
HOME Support of Language and Literacy	+	***	Moderate
Read Daily	+	*	Small
36-Month PPVT-III			
Supportiveness: Semistructured Play	+	***	Small
HOME Support of Language and Literacy	+	***	Moderate
Read Daily	+	n.s.	Small
36-Month Engagement of Parent in Semistructured Play			
Warm Sensitivity: Semistructured Play	+	***	Small
HOME Emotional Responsivity	+	***	Small
HOME Support of Language and Literacy	+	***	Small
Detachment: Semistructured Play	-	n.s.	Small
36-Month Sustained Attention to Objects in Semistructured Play			
Supportiveness: Semistructured Play	+	***	Small
HOME Support of Language and Literacy	+	**	Small
Knowledge of Infant Development	+	**	Small
Parental Distress	-	**	Small
36-Month Negativity Toward Parent in Semistructured Play			
Warm Sensitivity	-	***	Small
Physical Punishment in Last Week	+	n.s.	Small
Parental Distress	+	**	Small
Intrusiveness: Semistructured Play	+	***	Small
36-Month Aggressive Behavior			
Warm Sensitivity: Semistructured Play	-	***	Small
Physical Punishment in Last Week	+	***	Moderate
Parental Distress	+	***	Large
Regular Bedtime	-	n.s.	Small

[a] + Indicates positive association between the 2-year mediator and the 3-year impact.
- Indicates an inverse relationship.

[b] Small: 0 to under 10 percent
Moderate: 10 to under 40 percent
Large: 40 percent or more

* Significantly different from zero at the .10 level, two-tailed [or one-tailed] test.
** Significantly different from zero at the .05 level, two-tailed [or one-tailed] test.
*** Significantly different from zero at the .01 level, two-tailed [or one-tailed] test.

n.s. = not significant.

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sensitivity, cognitive stimulation, and support for the child's language development across a range of parenting situations (during play, through regular daily reading, and during everyday interactions in the home).

2. Mediators of Child Engagement of Parent and Sustained Attention to Objects

For models of positive aspects of children's social-emotional behavior during semistructured play, we estimated their association with warm and supportive parenting behavior and cognitive stimulation, which together are expected to influence the child's positive relationship with the parent. The mediated analysis suggests that the Early Head Start programs' positive impacts on the children's engagement of the parent in semistructured play at age 3 are consistent with earlier positive program impacts on the parent's sensitivity during play, responsiveness to the child, and cognitive stimulation and support for language development in the home.

The child's attention and focus on play at age 3 (sustained attention) is positively related to parents' sensitivity and cognitive stimulation during semistructured play a year earlier; support for cognitive development and language stimulation in the home environment in the previous year; and the parent's knowledge of child development measured at 2 years of age. Sustained attention toward objects during play at 3 years also is inversely related to parental distress measured in the previous year. In total, the mediated analysis estimates suggest that part of the positive impact on children's sustained attention to objects during semistructured play at age 3 could have come about because of earlier favorable program impacts on parent supportiveness in semistructured play, cognitive stimulation and language support in the home environment and knowledge of child development, and through reductions in parental distress.

3. Mediators of Negative Aspects of Children's Social-Emotional Development

Our analyses indicate that children's negativity toward their parents in semistructured play at 3 years of age is inversely related to parents' warm sensitivity during semistructured play observed in the previous year and positively related to levels of parental distress and intrusive behavior during semistructured play measured in the previous year. The relationship between child negativity at 3 and the parent's use of physical punishment a year earlier is not significant, however. In total, the estimates suggest that part of the reduction in levels of child negativity toward the parent during semistructured play that came about through Early Head Start participation at age 3 might be associated with the increases in parent warmth and sensitivity during play and reductions in parental distress and intrusiveness during play that Early Head Start produced one year earlier.

The estimates of the mediation model of children's aggressive behavior at 3 years of age and parenting behavior in the previous year indicate that children's aggression is inversely related to the parents' warm sensitivity during semistructured play and positively related to the use of physical punishment and levels of parental distress measured in the previous year. The relationship between aggression and the parents' setting a regular bedtime for the child is not significant, however. In total, the estimates indicate that part of the Early Head Start impact reducing levels of aggression in 3-year-old children may be attributable to the programs' positive impact on parents' warm sensitivity toward the child during play and to the programs' impact in reducing the incidence of physical punishment in the previous year. The relationship between children's aggressive behavior and earlier levels of parental distress appears fairly large, but the relationship may be overstated because of shared method variance. Part of the correlation may occur because distressed parents may view their children's behavior more negatively than an outside observer would. Parental distress and child aggression are both tapping a similar dimension of difficulty with child behaviors, and since they are reported by the same person (although at different points in time), the correlation is likely to be high.

4. Synopsis of Estimates from the Mediated Analyses

In summary, the estimates of models relating children's behavior at age 3 to parenting behavior measured a year earlier in the full sample suggest some support for the theory of change that at least a portion of the Early Head Start programs' impacts on children could have come about because of earlier favorable changes the program created in parenting behavior. The estimates of the relationships between parenting behavior and children's outcomes and the Early Head Start program impacts on these outcomes are consistent with the theory, although the models we have estimated are not structural and therefore cannot establish a causal link between the parenting impacts and impacts on children.

G. FATHERHOOD RESEARCH AND LOCAL RESEARCH CONTRIBUTIONS

The Early Head Start father studies have yielded extensive information about the fathers of Early Head Start children, both from the mothers and from the fathers themselves. In Box V.10, we summarize findings related to father presence, participation in their children's lives, and impacts of the program on fathers' interactions with their children.

Following the chapter conclusions, we include a series of local research reports that present site-specific findings related to the themes of this chapter—child development outcomes, parent-child relationships (including both mother-child and father-child), self-sufficiency outcomes, and explorations of factors mediating child outcomes. More details on these brief reports can be found in Volume III.

BOX V.10

FATHERS AND FATHER FIGURES IN THE LIVES OF EARLY HEAD START CHILDREN

Fathers are important in Early Head Start programs and most Early Head Start children are likely to have fathers in their lives. Early Head Start programs have increasingly devoted energies to involving men in program activities, and also to encouraging biological fathers and father figures to be more active participants with their children and families. The Early Head Start father studies began at a time when the majority of the research programs had not implemented specific father involvement components and did not target father outcomes as areas of expected change. Direct assessment of fathers and father outcomes were not included in the original evaluation design, but Father Studies were added to the research to provide descriptive information about the role of fathers or father figures (social fathers) in the lives of their children and to explore how father involvement in children's lives is related to child outcomes. Here we report features of father presence and participation in the lives of Early Head Start children.

Additionally, the growing prominence of father involvement in programs suggests an exploration of program control differences despite the fact that father involvement was not a part of the original evaluation or strongly emphasized when programs started up. Thus, we examined Early Head Start and control-group differences in father presence, father well-being, and father activities with their children in an exploratory manner. Hypotheses about program effects on fathers and father figures are complex given the early stage of father program development, and the joint possibility that programs could increase father involvement in some families and reduce father participation in others in cases where fathers are abusive to children or mothers or unwilling to seek treatment for substance abuse or mental illness. We reported in Chapter IV that Early Head Start fathers had a fairly low incidence of participation in program services which leads to a hypothesis that fathers would not be affected by the Early Head Start program. On the other hand, Early Head Start fathers were significantly more likely to participate in services than control group fathers which justifies the exploratory examination of program and control differences.

Data about fathers were collected from mothers and from fathers. As described in Chapter 2, our findings about fathers are drawn from mother interviews conducted in all 17 sites (at the time of the 14-, 24-, and 36-month birthday-related parent interviews we asked mothers about their child's father and any father figures) and from father interviews conducted in the 12 father study sites (when the children were approximately 24 and 36 months old). At 24 and 36 months, 7 of the 12 father study sites conducted a videotaped semistructured play task. At 24 months, the father video sites conducted the teaching task, and at 36 months they conducted the father-child puzzle challenge task. The videotaped tasks were conducted and coded using the same procedures as in the main study parent-child tasks. The father study measures and constructed variables are described in Appendix C.

Based on reports from mothers, most Early Head Start children had some contact with their biological father when the children were 36 months old. If the child did not live with his or her biological father, we asked the mother about the nonresident biological father and how often the father saw the child. If the father saw the child a few times per month or more, we categorized the family as having a father who was present in his child's life. As reported by the mothers when the children were 36 months old, almost 75 percent of children lived with or had contact a few times per month or more with their biological father.

Mothers reported that almost all Early Head Start children had a father or father figure in their lives. When the mother reported that there was a nonresident biological father, we also asked her about any other men who might be "like a father" to the child. If the mother named a father figure, we categorized the family as having a father figure who was present in the child's life. Close to 90 percent of the children had either a biological father or a father figure in their lives at 36 months. These rates of father presence were consistent with mother reports of father presence when the children were 14 and 24 months old.

When the children were 36 months old, 40 percent of mothers reported that they were married. Just over one-third were married to the child's biological father and about 6 percent were married to someone else. At enrollment, 26 percent of mothers interviewed at 36 months reported that they were married (to the child's biological father or someone else) so more mothers reported being married at 36 months than when they began the program. At 36 months, about half of the mothers reported that they were in a relationship with the child's biological father in which he was either her spouse, live-in partner, or boyfriend.

Rates of biological father and male presence were similar at 36 months across the Early Head Start and control groups. Biological father presence was 73 and 71 percent and male presence was 90 and 89 percent, respectively, for the Early Head Start and control groups. (See table.) At 36 months, rates of marriage to the biological father in the Early Head Start and control groups were about the same (35 and 36 percent, respectively). Similarly, the proportion of biological fathers who were the mothers' husband, boyfriend, or live-in partner at 36 months did not differ between the Early Head Start and control groups (49 and 51 percent respectively). These results are not surprising because programs worked individually with families which would have led to some increases and some decreases in father presence.

When the children were 36 months old, Early Head Start fathers and father figures in the 12 father study sites reported that they participated in their children's lives in a variety of ways. Fathers reported participating in a number of activities with their children, including caregiving, engaging in social activities, cognitive activities, and physical play.

Early Head Start programs had several important impacts on father involvement with children. Based on father interview and videotaped interaction data gathered in the father study sites, fathers whose families participated in the Early Head Start program spanked less, were less punitive in discipline practices and were less intrusive in interacting with their children than fathers in the control group (see table). Early Head Start and control-group fathers did not differ in terms of positive discipline strategies, other parenting behaviors and attitudes, father well-being, and the frequency of caregiving, social, cognitive, and physical play activities with their children.[1] Although some programs were working with families to increase father involvement with their children, the majority of the programs were at very early stages in these efforts.

Early Head Start children showed significantly more positive behaviors in interaction with their fathers/father figures than control-group children with theirs. In the semistructured play task, Early Head Start children scored higher on engaging their fathers/father figures in play and demonstrated more sustained attention than control-group children. There was not a significant program effect on father reports of children's aggressive behavior, negative behavior toward the father, or other measures of the child's behavior during the puzzle challenge task with the fathers.

In summary, most Early Head Start children are likely to have fathers in their lives and Early Head Start is making a positive difference in some aspects of fathering and father-child interaction. The majority of mothers are not married to the focus child's father. The program and control groups were similar in father presence and marriage of children's father to their mothers. On the other hand, even though the program is in early stages in implementing intentional father involvement practices, fathers participated in the program activities considerably more than they would have had they not been involved in Early Head Start and there were some important impacts on their parenting practices as well as on father-child interactions. Some of the impacts on father-child interaction are of the type that would be expected to lead to overall improved outcomes for children.

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[1] Father-child activities, discipline, parenting behavior, and father's well-being were drawn from father interviews and father-child videotaped interactions when the children were approximately 36 months old. Unlike the mother reported data, the father-reported and father interaction group differences were pooled and not weighted by site because of sample size constraints.

GROUP DIFFERENCES IN FATHER PRESENCE, ACTIVITIES WITH CHILD, FATHER WELLBEING, DISCIPLINE STRATEGIES, PARENTING BEHAVIORS, AND CHILD BEHAVIOR WITH FATHER

	Program Group[a]	Control Group[b]	Estimated Impact per Participant[c]	Effect Size[d]
Father Presence				
Biological Father Present in Child's Life (Percentage)	72.7	70.9	1.8	4.0
Male Present in Child's Life (Percentage)	89.8	88.5	1.3	4.3
Respondent Married to Biological Father (Percentage)	34.6	35.6	-1.0	-2.0
Biological Father is Currently Married to, Lives with, or is Boyfriend of Respondent (Percentage)	48.9	50.5	-1.6	-3.3
Father Activities with Child				
Frequency of Caregiving Activities Score	48.5	49.3	-0.8	-7.4
Frequency of Social Activities Score	49.2	49.1	0.1	0.7
Frequency of Cognitive Activities Score	49.6	49.1	0.4	3.9
Frequency of Physical Play Score	48.9	49.6	-0.8	-7.5
Father Well-Being				
Parenting Stress Index (PSI): Parental Distress	19.4	19.3	0.1	1.4
PSI: Parent-Child Dysfunctional Interaction	14.1	14.3	-0.2	-4.7
CES-D Not at Risk of Depression (Percentage)	61.3	56.0	5.3	10.7
CES-D: Severe Depressive Symptoms (Percentage)	5.3	7.3	-2.0	-8.0
Family Environment Scale – Family Conflict (Average Score)	1.4	1.5	-0.1	-10.3
Discipline Strategies				
Index of Severity of Discipline Strategies	3.3	3.4	-0.2	-10.6
Percentage of Fathers Who Spanked the Child in the Past Week	25.4	35.6	-10.2**	-21.0

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	Program Group[a]	Control Group[b]	Estimated Impact per Participant[c]	Effect Size[d]
Percentage of Fathers Who Would Use Mild Discipline Only	37.9	33.2	4.7	10.0
Parenting Behavior				
Supportiveness During Father-Child Semistructured Play	4.1	4.0	0.2	17.9
Intrusiveness During Father-Child Semistructured Play	1.4	1.3	0.0	6.2
Quality of Assistance During Father-Child Puzzle Challenge Task	3.3	3.3	-0.0	-3.6
Intrusiveness During Father-Child Puzzle Challenge Task	2.4	2.8	-0.4**	-30.4
Child Behavior with Father				
Child Behavior Checklist-Aggressive Behavior	10.6	10.9	-0.3	-4.5
Engagement of Father During Father-Child Semistructured Play	5.1	4.8	0.3**	29.8
Sustained Attention with Objects During Father-Child Semistructured Play	5.2	4.9	0.3**	32.6
Negativity Toward Father During Father-Child Semistructured Play	1.1	1.1	-0.1	-12.6
Engagement of Father During Father-Child Puzzle Challenge Task	5.2	5.3	-0.1	-8.9
Persistence During Father-Child Puzzle Challenge Task	4.9	4.9	-0.0	-1.9
Frustration During Father-Child Puzzle Challenge Task	2.3	2.3	-0.0	-2.4
Sample Size				
Mother Interview	1055	957		
Father Interview	356	330		
Father-Child Interactions	148	141		

SOURCE: Parent interviews in all 17 sites when children were approximately 36 months old. Father interviews and father-child semi-structured interactions in the 12 father study sites conducted when children were approximately 36 months old.

NOTE: All mother-reported impact estimates were calculated using regression models, where each site was weighted equally. All father-reported and father-child interaction impact estimates were calculated using regression models that pooled across sites.

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[a]A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities.

[b]The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean was estimated as the difference between the program group mean for participants and the impact per participant.

[c]The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for all program and control group members.

[d]The effect size was calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact expressed as a percentage of the standard deviation).

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

H. CONCLUSIONS

The analysis of the Early Head Start programs' overall impacts when children were about 3 years old, averaging across all types of programs and all types of families, shows a large number of favorable impacts for children and their parents. In large measure, these impacts sustain the impacts found a year earlier, when the children were 2. For children, the Early Head Start research programs:

- Produced sustained, significant positive impacts on cognitive and language development at age 3. Early Head Start children were significantly less likely than control-group children to score in the at-risk range of developmental functioning in these areas.
- The programs had favorable impacts on more aspects of social-emotional development at age 3 than at age 2—Early Head Start children engaged their parents more, were less negative to their parents, and were more attentive to objects during play, and Early Head Start children were rated lower in aggressive behavior by their parents than control children.

When children were 3, the Early Head Start programs also continued to have significant favorable impacts on a wide range of parenting outcomes:

- Early Head Start parents were observed to be more emotionally supportive and to provide more support for language and learning than control-group parents (for example, they were more likely to read to their children daily).
- Early Head Start parents were also less likely than control-group parents to engage in negative parenting behaviors. Early Head Start parents were less likely to report that they spanked their child in the past week, and they reported greater knowledge of mild discipline strategies.
- When children were 3, Early Head Start parents did not differ significantly from control parents in any of the mental health outcomes we assessed, although they had significantly less parenting stress and family conflict when children were 2. However, growth curve analyses, while subject to some limitations, suggested that family conflict decreased over time for program but not for control parents.
- The Early Head Start programs had some important impacts on parents' progress toward self-sufficiency. The positive impacts on participation in education and job training activities continued through the 26 months following enrollment, and some impacts on employment began emerging late in that follow-up period in some

subgroups. These impacts had not yet resulted in significant improvements in income, however.

- Early Head Start families were less likely to experience subsequent births during the first two years after they enrolled and may have been less likely to experience the economic and psychological consequences of rapid repeat births.

Finally, although the programs had less experience in providing services specifically to fathers, they had significant favorable impacts in several areas of fathering and father-child interactions:

- Program fathers had significant favorable impacts in several areas of fathering. They spanked less and were less intrusive. In father-child interactions, program children were more engaging of their fathers and showed greater sustained attention than control children did.

Analyses of potential mediators of the impacts on 3-year-old children provide support for programs' theories of change that indicate program efforts to enhance aspects of parenting and the home environment may contribute to longer-term impacts on children:

- Impacts on children's cognitive and language development at age 3 were associated with parents who were more supportive in their interactions with their children and provided more language and literacy supports in the home at age 2.
- Impacts on some of the positive aspects of social-emotional development (engagement of parent and sustained attention) when children were 3 were associated, to a small degree, with such parenting behaviors as warm sensitivity and emotional responsivity, and with parents' knowledge of infant/toddler development, at age 2.
- Impacts showing lower levels of children's aggressive behavior and negativity toward their parents at age 3 appeared to be mediated by parenting a year earlier that was characterized by less physical punishment, lower parental distress, and greater warmth.

The consistent pattern of statistically significant, favorable impacts across a wide range of outcomes when children were 2 and 3 years old is promising. This pattern suggests that Early Head Start programs, overall, may be improving the balance of risk and protective factors in the lives of the low-income families they serve.

BOX V.11

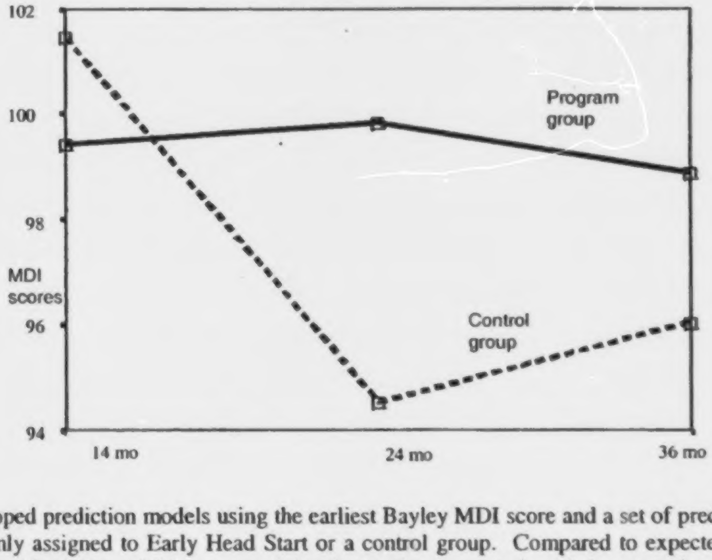
HOW MUCH BETTER THAN EXPECTED? IMPROVING COGNITIVE OUTCOMES IN UTAH'S BEAR RIVER EARLY HEAD START

L.A. Roggman, L.K. Boyce, G.A. Cook, and A.D. Hart
Utah State University

What are the strongest early predictors of later cognitive skills? Do Early Head Start children do better than expected, based on predictions? What aspects of Early Head Start are related to how much better they do? To test whether development is "better" for children in our local Early Head Start group than for the control group, we first examined the strongest early predictors of later Bayley MDI scores (at 36 months). We then developed statistical models using developmental measures at more than one age point, a grouping variable indicating whether or not the child's family was in Early Head Start, and a set of the strongest early predictors of children's later cognitive outcomes.

The strongest early predictors of poorer later cognitive skills were earlier measures of cognitive skills. Other early predictors were mothers' low education, avoidance in close relationships, and poor use of social support. We used these strong correlates as covariates in a statistical test of the interaction between age and intervention. Age changes in the Bayley MDI scores over time showed a significant decline for the control group but not for the Early Head Start group (see Figure 1).

Figure 1. Differences over Time in Cognitive Skills
(Bayley MDI Standardized Scores)



Next, we developed prediction models using the earliest Bayley MDI score and a set of predictors from before families were randomly assigned to Early Head Start or a control group. Compared to expected scores based on early predictors, Early Head Start children were doing better than expected, and the control group children were doing worse. Differences between actual and expected scores from early predictors significantly favored Early Head Start children. The advantage Early Head Start children gained was related to how engaged their mothers were in Early Head Start home visits. Home visit engagement, in turn, was related to more involvement in other Early Head Start activities, more facilitative home visitors, and less maternal avoidance.

In summary, cognitive development was progressing better for children in Bear River Early Head Start than for children in the comparison group. While cognitive skills scores declined for the control group, they did not for the Early Head Start children who maintained age-appropriate progress in developing their cognitive skills. Mothers' involvement in Early Head Start appeared to buffer early risk factors for poor cognitive development.

BOX V.12

MOTHER-CHILD LANGUAGE AT 14 AND 24 MONTHS: CONCURRENT AND LAGGED ASSOCIATIONS

Elizabeth Spier, Catherine S. Tamis-LeMonda, and Mark Spellmann
New York University

Barbara Alexander Pan and Meredith Rowe
Harvard Graduate School of Education

The quality and quantity of caregivers' language is one of the most powerful predictors of children's early language and cognitive development. Thus, a fundamental goal of many Early Head Start practitioners is to encourage parents to talk frequently with their children in ways that are sensitive to children's emergent language (for example, by asking question like "What is that?" that elicit the child's own verbal participation). Parenting often mediates the impact of early interventions and parents' verbal input accounts for much of the variation linking poverty to compromised child outcomes (Hart and Risley 1995). Given the importance of parents' language input in developing children's language and cognition, researchers at New York and Harvard Universities have focused on the amount and diversity of language to which young children are exposed during the foundational period of 14 to 24 months. In this study, we merged transcript data from the two local research sites and explored associations between mothers' language and children's language and developmental status.

The sample consisted of 146 mother-child dyads participating in the research at the New York and Vermont sites. Forty-eight percent of the participants were white, 25 percent were African American, 17 percent were Hispanic, and 10 percent fell into other groups (for example, West Indian, Asian, mixed ethnicity). All parents spoke English.

We used the semistructured, three-bag task from the national protocol as the basis of mother and child language at both 14 and 24 months. We transcribed play sessions and tabulated the total number of words (tokens) and different words (types) expressed by each mother and child at each age, as well as mothers' total number of "wh" questions. Children's Bayley MDI performance and data from the MacArthur CDI were included in analyses.

Findings revealed that mothers' language predicted most child measures at 14 and 24 months. Maternal word types, tokens, and "wh" questions were consistently associated with children's comprehension and production on the MacArthur CDI and Bayley MDI scores, as well as on the Bayley Language factor. Maternal word types correlated with children's types and tokens, albeit weakly. At 24 months, maternal language measures were associated with every measure in children, except for tokens. Lagged correlations indicate that mothers' earlier language was associated with children's language and developmental status over time.

Next, simultaneous regressions were conducted in which we examined the joint contributions of child and mother at 14 months to each child and mother outcome. Regressions indicated that mothers and children *both* contributed unique variance to children's language and cognitive outcomes, explaining between 11 and 32 percent of the variance in 24-month measures. However, children's 14-month language did not predict mothers' later language over and above mothers' stability. The strongest predictor of 24-month maternal language was the mother's earlier language, which explained up to 44 percent of the variance in her later language. Children were also stable in language and developmental status.

Together, these findings indicate that mothers' language at the onset of children's second year is beginning to make a difference in children's emergent cognitive and linguistic abilities. Therefore, it is important to encourage mothers to talk to and ask questions of their children well before children speak with regularity.

BOX V.13
FUNCTIONS OF LANGUAGE USE IN MOTHER-TODDLER COMMUNICATION[1]

Joanne Roberts, Catherine S. Tamis-LeMonda, and Mark Spellmann
New York University

Caregivers who provide children with verbally rich, responsive language environments in the early stages of language acquisition have children who excel in lexical, grammatical, and syntactic abilities and who achieve important language milestones sooner. Understanding links between parenting and children's emerging language competencies is central to understanding and modeling associations between Early Head Start and developmental achievements in children.

Investigators at New York University have been investigating the language environments to which children are exposed in relation to their early communicative abilities. We wanted to examine associations between mothers' and children's language at 14 months, during initial stages of language acquisition. Because children have a limited productive vocabulary at 14 months, we developed a way to assess their communicative intentions that incorporated verbalizations and gesture in determining their communicative intent.

The sample consisted of 75 ethnically diverse mother-child dyads (63.6 percent of the children were male), the first wave of participants at New York University's local research program. We transcribed maternal speech and actions, as well as all child vocalizations and actions, from the 10-minute, semistructured play task. We coded maternal utterances into 1 of 17 language functions and children's vocalizations as 1 of 9 functions.

Variation in amount and function of language among mothers and children was dramatic. Mothers expressed between 20 and 331 utterances, children between 0 and 117 utterances. Factor analysis, with varimax rotation, was conducted on mothers' and children's language. Three factors of maternal language emerged:

1. Responsive/Didactic: Language in which the mother is repeating and expanding on the child's vocalizations, reformulating the child's behaviors into words, proposing questions to the child, and labeling and describing objects and events
2. Directive: Language characterized by mothers' control and direction of children's actions, as well as by prohibitions and corrections
3. Uninvolved/Hostile: Language characterized by mothers' self-directed comments and criticism of the child

For children, two factors of communication emerged:

1. Communicative: Utterances that are responsive to the social partner or that relate information about objects, events, desires and interactions with others
2. Distress: Utterances that express discontent, frustration or objection

Analyses showed that the maternal responsive/didactic factor related to children's communicative factor, as did the maternal directive factor. The maternal directive factor also related to the children's distress factor. Further breakdown of these associations revealed that mothers' responsive/didactic language speech predicted children's imitations, expression of notice, references to actions in play, and declaratives. Mothers' directive speech related only to children's objections/refusals, The maternal uninvolved/hostile factor did not relate to children's language.

These findings show that it is important for programs to support mothers in their use of frequent, didactic-responsive language to encourage children's verbal fluency. Focusing solely on decreasing uninvolved/hostile communications in mothers, while important to social-emotional aspects of children's development, is not sufficient for increasing children's language achievements.

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[1] This research is taken from: Roberts, J. & Tamis-LeMonda, C. S. (2000, June). Functions of language use in mother toddler communication. In J. Atwater (Chair), the social context of early language development for children in poverty. Symposium conducted at Head Start's National Research Conference, Washington, D.C.

BOX V.14

PARENT RESPONSIVENESS AND CHILDREN'S DEVELOPMENTAL OUTCOMES KANSAS EARLY HEAD START PARTNERSHIP

Jane Atwater, Judith Carta, Jean Ann Summers, and Martha Staker
University of Kansas and Project EAGLE Early Head Start

The Kansas Early Head Start Partnership identified responsive parent-child interaction as an optimal and essential context for promoting children's development and fostering families' well-being. In these analyses, we examined parent responsiveness as a predictor of early development for children in multirisk families. In addition, for Early Head Start families, we asked whether their level of engagement in home-based services was related to parents' responsiveness with their children and to children's developmental progress. The analysis sample consisted of 74 Early Head Start families and 79 control group families in an ethnically diverse, urban community.

Parent responsiveness was assessed during home-based observations when children were 8, 14, 18, 24, 30 and 36 months old. Responsiveness measures included two composite variables—Parent Talk to the Child and Close Involvement—that provided an index of the parent's general responsiveness with the child and three specific variables—Prompt/Expansion of Child Communication, Positive/Exuberant Response, and Shared Parent-Child Activities—that described qualitative features of Parent Talk and Close Involvement. Parent engagement in the Early Head Start program was based on Early Head Start staff ratings of the level and consistency of parent participation over time, active interest and involvement during home visits, and parents' follow-through on individual program goals between visits.

To track children's developmental progress, we focused on growth over time in children's cognitive development (performance on the Bayley MDI) and language development (children's verbal communication during typical activities at home). Child assessments were conducted at 8, 14, 18, 24, 30 and 36 months of age.

The Relationship of Parent Responsiveness to Children's Development. In analyses of children's developmental trajectories, every measure of verbal responsiveness (Parent Talk, Prompt/Expansion, and Positive/Exuberant Response) was a significant predictor of Bayley scores. Shared Activity also was positively related to cognitive outcomes and was the only significant predictor of *growth* in cognitive development from 8 to 36 months. Results for children's verbal communication were even more striking and consistent. Every measure of responsiveness was a significant predictor of communication outcomes and increases in verbal communication from 8 to 36 months. When parents were more verbally responsive and involved in their children's activities, children talked more, and their use of words increased more rapidly.

The Relationship of Program Engagement to Parent Responsiveness and Child Development. Parents with the highest level of program engagement had higher rates of verbal responsiveness with their children. That is, the parenting behaviors most clearly related to child outcomes occurred more frequently in families highly engaged in the Early Head Start program. Moreover, engagement in the program was predictive of more positive outcomes in children's cognitive development and verbal communication and of growth over time in verbal communication. Thus, these results provide evidence of a positive relationship between program engagement and developmental progress and suggest that responsive interactions might be one process that supports that relationship. The results of these analyses provide empirical support for the Early Head Start program's emphasis on responsive parent-child interactions as a key component of intervention for children and families who experience multiple risks.

BOX V.15

OUTCOMES OF PROGRAM PARTICIPATION AND CORRELATES OF CHILDREN'S COGNITIVE DEVELOPMENT AT THE EDUCATIONAL ALLIANCE'S EARLY HEAD START

Mark Spellmann, Catherine Tamis-LeMonda, Maria Yarolin, Lisa Baumwell, Joanne Roberts, and the NYU Early Childhood Research Team

In this study, we addressed two research questions:

1. What child and parent outcomes did participation in Early Head Start affect?
2. What child and parent characteristics were associated with children's cognitive development?

We tested two dimensions of program participation for effects on child and parent outcomes: (1) children's attendance at the Early Head Start child care centers, and (2) the degree of parent involvement with Early Head Start social service staff.

For children, outcomes of program participation included greater cognitive development at 14, 24 and 36 months; greater social development; and greater language development.

Parental domains significantly associated with program participation included the quality of parent-child interaction, the quality of parenting, discipline strategies, parenting stress, psychological well-being, and social support.

We also wanted to explore correlates of children's cognitive development, as measured by the Bayley Mental Development Index (MDI), which were given when children were 14, 24 and 36 months old.

Observational measures of the quality of parenting and the quality of parent language use showed substantial associations with cognitive development at 24 and 36 months. The quality of parent-child interaction was significantly associated with cognitive development at 24 and 36 months. Self-rated parenting measures were also associated with cognitive development.

Father involvement was associated with children's' cognitive development, as was the quality of the home environment.

Emotional social support and advice and guidance social support that mothers received were associated with child cognitive development. Support mothers received from their own mothers, and from their babies' fathers, was associated with MDI scores.

Program engagement variables were associated with child cognitive development. Four measures of positive program involvement—Social Support from EHS staff, "What I Got from EHS: Growth as a Parent," "What I Got from EHS: Family-Program Bond," "What I Got from EHS: Child Development"—were positively associated with children's cognitive development at 14 and 36 months.

Measures of parents' emotional well-being were significantly associated with children's cognitive development. Symptoms of post-traumatic stress disorder and parenting stress were negatively associated with cognitive development. Harsh, rejecting fathering that mothers received when they were growing up was negatively associated with cognitive development of their young children at all three age milestones. The quality of mothering in mothers' families of origin was associated with MDI scores at 14 and 24 months.

Other aspects of child development also demonstrated significant association with cognitive development. Social development, measured both by parent ratings of children's social development and by observational measures of child-parent interaction, showed a strong correlation with cognitive development. Mother's ratings of children's distractibility, difficult temperament, and difficult behavior were associated with lower MDI scores at 36 months. Children's health was associated with cognitive development at 36 months.

The wide range of factors associated with cognitive development scores illustrate that children's cognitive development is embedded in multiple levels of systems, at the child, family, and program levels. The implication of these findings is that early intervention programs are likely to be increasingly effective to the degree that they are able to address every level of the system in which children's cognitive development is embedded.

BOX V.16

RELATIONS BETWEEN SPECIFIC AND GLOBAL FEATURES OF MOTHER-CHILD INTERACTIONS AND LANGUAGE

Catherine S. Tamis-LeMonda, Elizabeth Spier, and Mark Spellmann
New York University

Barbara Alexander Pan and Meredith Rowe
Harvard University

The quality of parent-child interactions is one of the most powerful predictors of children's emerging cognitive competencies, especially language. Many researchers, practitioners, educators, and parents want to know which features of parenting are most relevant to positive outcomes for children, as well as the best ways to capture and evaluate those features in research and practice settings. Many approaches to the coding of parent-child interactions are available, and theoretical orientation and practical constraints guide decisions about which to use.

For example, the national study used measures of caregiver-child interactions during semistructured play based on *global* ratings of six aspects of behavior in mothers (sensitivity, intrusiveness, stimulation, positive regard, negative regard, and detachment) and three in children (engagement, sustained attention, and negativity). Because global ratings are more efficient to complete than more complex rating systems, large-scale studies frequently rely upon such codings. In contrast, researchers at many local sites, including New York and Harvard Universities, transcribed the full array of verbal and gestural exchanges between mothers and children during the semistructured play tasks to describe and capture *specific* aspects of parent-child engagements. Both "macro" and "micro" approaches to assessing parenting have merits, and both have limitations. Little is known about whether and how data obtained from the two relate to each another, however. Here, we explore associations between transcriptions of mothers' and children's language obtained locally and global ratings of mother-child interactions (obtained at the national level).

Research teams at Harvard Graduate School of Education and New York University Graduate School of Education longitudinally examined mother-child discourse in a total of 146 dyads during the semistructured play task at 14 and 24 months. The sample was ethnically diverse: 47 percent white, 25 percent African American, 17 percent Hispanic, and 11 percent other (for example, mixed ethnicity).

We obtained maternal language samples through transcription of the semistructured play task. We counted the number of different words (word types) each mother and child used; the total number of words (tokens) each mother and child used, and the number of "wh" questions each mother used during the 14- and 24-month sessions. Global ratings of mother-child interactions from this task were those coded nationally by the national evaluation team.

Findings indicated that mothers' total words, word types, and "wh" questions were positively associated with ratings of sensitivity, stimulation, and positive regard and negatively associated with detachment (*r*s range from .19 to .66, *p*s < .05 to .001). We next tested the joint contributions of mothers' language types, tokens, and "wh" questions to the composite score of "supportiveness" (a composite measure created by the national team by summing mothers' ratings on the three items). At both ages, maternal language types and "wh" questions (but not tokens) contributed unique variance to the composite measure of supportiveness, together accounting for 40 and 42 percent of the variance at 14 and 24 months, respectively.

In children, associations between language and global ratings of their engagement, attention, and negativity varied with age. At 14 months, children's word types and tokens were weakly associated with global measures of child engagement and attention (*r*s range from .17 to .20, *p*s < .05); by 24 months, however, associations were moderate to strong (*r*s range from .33 to .51, *p*s < .001).

In general, results support the validity of national measures of parent-child interactions by demonstrating their strong associations to independently coded, in-depth measures of mother and child language at two local sites. They also indicate that coders are acutely sensitive to mothers' and children's language when coding dyadic interactions. Finally, these findings have important implications for program staff. Staff should be sensitized to the importance of mothers' and children's language interactions as key expressions and indicators of mutual sensitivity and cognitively rewarding interactions.

BOX V.17

SYNOPSIS OF MOTHERS' SOCIALIZATION OF TODDLER CONFLICT RESOLUTION

Lisa Baumwell, Tonia Cristofaro, and Mark Spellmann
New York University

Young children commonly engage in conflicts with peers. Parents play an important role in transmitting beliefs about how their children should resolve these conflicts. Research suggests that parents' beliefs, when translated into child-rearing practices, influence children's social competence. For example, the belief that aggression is a socially acceptable strategy has been found to be associated with children's aggressive behaviors.

To date, few studies have examined mothers' beliefs about how their toddlers should resolve peer conflict. Therefore, we sought to characterize mothers' attitudes about the conflict resolution strategies that their 3-year-olds should employ with intruding peers. We also examined how participation in Early Head Start influences maternal beliefs about conflict resolution strategies.

Sixty ethnically diverse mothers of 27 girls and 33 boys participated in this study. Participants were a subset of the 36-month Early Head Start cohort in New York City. During the 36-month-home visit, mothers completed a self-administered questionnaire on conflict resolution strategies. This is a social problem-solving scale, based on one used by Slaby and Guerra (1988), that required mothers to select strategies that they would want their 3-year-old children to use in four scenarios depicting peer disagreements. Mothers selected one of five strategies appropriate to the scenario. The strategies reflected ***verbal aggression, physical aggression, walk away, ask an adult for help***, and ***verbal prosocial responses*** (words with peers).

We calculated frequencies of the five strategies across the four situations. Ninety-two percent of mothers chose ***ask an adult for help*** and 75 percent selected ***verbal prosocial responses*** at least once. Thirty-eight percent of mothers endorsed ***walk away***, 23 percent chose ***physical aggression***, and only 8 percent supported the use of ***verbal aggression*** at least once. In addition, mothers were consistent in the strategies they adopted. Most mothers who selected ***verbal aggression*** also selected physical aggression. Mothers who selected ***prosocial peer responses*** and ***ask an adult for help*** were less likely to select ***aggression*** as a strategy to solve peer conflict.

We calculated multiple t tests to examine how participation in Early Head Start influenced mothers' beliefs about their children's conflict resolution. Participants whose attendance was rated "fair" to "excellent" at Teen Aid High School and Educational Alliance were compared with control parents. Teen Aid participants chose walking away more. Mothers attending Educational Alliance endorsed physical aggression less and chose asking an adult for help rather than walking away.

In summary, this investigation elucidates mothers' beliefs about their children's problem-solving strategies with peers. Our findings suggest that these beliefs can be modified in ways that may help children become more socially competent.

BOX V.18

CHANGE IN PARENT-CHILD INTERACTION IN LOW-INCOME FAMILIES: LINKS TO FATHER STATUS

L.A. Van Egeren, L. McKelvey, H.E. Fitzgerald, R.F. Schiffman, M. Cunningham DeLuca, and M. Hawver
Michigan State University

Contingent responsiveness is a foundation of child socioemotional and cognitive adjustment (Bornstein et al. 1999; and Watson 1985). Among low-income families who experience high rates of single motherhood, inconsistent father involvement, and transitory male figures in children's lives, how mothers' and fathers' interactions with their children mutually develop warrants particular attention. This study examines changes in contingent responsiveness of low-income parent-child dyads over a two-and-a-half-year period.

The sample for this study consisted of 71 families (children, mothers, and men the mother identified as the child's father or father figure) participating in an ongoing longitudinal study of children eligible for Early Head Start in Jackson, Michigan. At enrollment, 24 months, and 36 months, each parent participated in a teaching task with the child, which was rated using the Nursing Child Assessment Teaching Scale (Sumner and Spietz 1994). To assess the quality of contingent interactions, we used three parental contingency scales—Sensitivity to Cues, Social-Emotional Growth Fostering, and Cognitive Growth Fostering—and two child scales—Clarity of Cues and Contingent Responsiveness to Caregiver. We asked the mother about paternal residency and biological father status.

We used hierarchical linear modeling to derive an overall trajectory for the interaction scores of each parent and child while accounting for interdependencies between parents.

Mean level. At enrollment, mothers were more sensitive than fathers to infant cues but less likely to foster social-emotional or cognitive growth. By 36 months, the pattern had reversed: fathers tended to be more sensitive to cues than mothers but were less likely to foster social-emotional or cognitive growth. Children gave clearer cues to fathers at enrollment but, at 36 months, they showed no difference in behavior toward either parent.

Linear Change. Both parents' sensitivity to the child's cues and cognitive-growth fostering increased significantly over time. Although mothers increased in social-growth fostering, fathers decreased substantially. Mothers increased more than fathers in sensitivity to cues and cognitive-growth fostering. Children increased significantly in the clarity of cues and responsiveness, particularly toward mothers.

Father status was consistently related to father sensitivity to cues. At enrollment, residential fathers were less sensitive than nonresidential fathers, and biological fathers were less sensitive than nonbiological fathers. By 36 months, both residential and biological fathers had increased in sensitivity to cues, and residential fathers had also increased in cognitive-growth fostering. Interactions between the two father status variables suggested that the quality of mothers' and children's contingent interactions decreased when the father was a nonresidential social father.

The results suggest that fathers and mothers were more similar in their contingent responsiveness toward the child by 36 months than during early infancy. Children's contingent responsiveness originally favored fathers, then became similar toward both parents. Father status worked in distinct ways for mothers and fathers that were specific to different types of responsiveness.

BOX V.19

FATHER-CHILD INTERACTIONS: MEASURING PAST PATERNAL INFLUENCES

Jacqueline D. Shannon, Catherine S. Tamis-LeMonda, Joanne Joseph, Bonnie Hannibal,
Tracy Poon, Michele Pelnar, and Vanessa Rodriguez
New York University

The Early Head Start Fathers' group grew out of a need to further understand father involvement in low-income families. In New York City, we examined father-child interactions and whether a father's interaction style related to paternal relationships in his own childhood.

We examined the interaction styles of 57 ethnically diverse, inner-city fathers with their 24-month-olds (28 boys). Our goals were to:

- Describe the nature of fathers' interaction styles.
- Compare the relationship between fathers' interaction styles and their children's social, emotional, and cognitive behaviors.
- Assess the extent to which fathers' perceptions of paternal relationships in their own childhoods relate to their own fathering interaction styles.
- Explore men's feelings toward and perceptions of their childhood experiences with their fathers.

Data collection consisted of videotaped father-child interactions during semistructured free play, fathers' perceptions of paternal childhood experiences measured through the Parental Acceptance-Rejection Questionnaire, and 18 semistructured qualitative interviews. We assessed father-child interactions using the Caregiver-Child Affect, Responsive and Engagement Scale (C-CARES). The C-CARES measures parent-child interactions on 15 parent and 14 child behaviors, which are individually rated on a 5-point Likert scale ranging from 1—"not observed" to 5—"constantly observed."

We identified three meaningful clusters of father interaction styles:

1. ***Responsive/Didactic.*** These fathers demonstrated great awareness and responsiveness to children's emotional needs. They were flexible and sensitive to appropriate teaching moments and ways to engage their children in play without being overtly achievement-oriented. This parenting style appeared to be positively associated with children's social and cognitive abilities.

2. ***Overbearing.*** These fathers were driven to teach their children skills; however, they were highly structured and primarily intrusive. These overly controlling fathers appeared to diminish children's exploratory and communicative initiatives.

3. ***Disengaged.*** These fathers were uninvolved with their children and unresponsive to them. Their children were also unresponsive to them and only moderately involved with toys, playing with them in a rudimentary, unsophisticated manner.

Because children are not passive recipients of fathering, they might influence their fathers' interaction styles. Children who exhibit sophisticated language and play might promote sensitive, didactic interactions with their fathers. Similarly, less capable children might be less rewarding social partners, thereby compromising the quality of their fathers' engagements.

Fathers' experiences of paternal warmth were not associated with their interaction style. However, overbearing and responsive/didactic fathers were more likely than disengaged ones to perceive lower levels of paternal rejection. All fathers were committed to "being there" physically and emotionally for their children, regardless of the quality of their childhood experiences with their own fathers. Findings support the notion that fathers' childhood experiences of paternal rejection relate negatively to quality parenting interactions. However, to more fully appreciate how these experiences shape fathers' interactions and involvement with their children, additional variables should be considered. A deeper understanding of how inner-city fathers' parenting roles and interaction styles have been shaped could help improve services available to them and their families.

BOX V.20

ANDREYA EARNS HER HIGH SCHOOL DEGREE: THE ROLE OF EARLY HEAD START

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University of Missouri-Columbia

Andreya[1] was 19 and living with her 1-year-old son, her mother, her 16-year-old brother, and her 12-year old cousin in the inner core of a large Midwestern city when we first met her in 1996. She had agreed to participate in our case study research. Like almost all the mothers served by the Early Head Start program in which she was enrolled, she was African American, young, and single. She had been 17 and in the second semester of 11th grade when she'd become pregnant and dropped out of high school.

Still hoping to earn a high school diploma, Andreya had recently begun attending Job Corps classes.[2] She had also enrolled in Early Head Start. Looking back five years later, she believes, as we do, that her Early Head Start home visitor played a pivotal role in guiding and supporting her through the challenges that threatened to derail her as she struggled to stay in school. (Volume III contains a case study describing both the barriers and the support Andreya encountered during her Job Corps experience). Here, we summarize the obstacles Andreya faced and the assistance her Early Head Start home visitor provided to her.

A list of the obstacles might begin with Andreya's poverty and the poor quality of the schools she had attended in her inner-city neighborhood. These conditions help explain the absence of academically successful role models in her family, as well as her quick temper, emotional neediness, and low self-concept. In addition, her partner saw no good reason for her to continue her education. Clearly, it was difficult to study under these circumstances. Other sources of stress were ongoing family conflict, worry over her son's chronic asthma and aggressiveness, and a second pregnancy and birth before she had completed her Job Corps course work. Because both her children were asthmatic, she missed many days of school to tend to them. The initially unsympathetic attitude of the Job Corps staff toward her absences further undermined her confidence and resolve. Economic hardship exacerbated all of these problems.

On the positive side, her mother and grandmother were unswerving in their messages that she should break with family tradition and be the first in the family to graduate. Moreover, Andreya loved her children and wanted to do whatever was best for them, including completing high school so that she would be better equipped for the job market. Rickie, her Early Head Start home visitor, built on these qualities. He agreed that graduating should be a primary goal and, each time she considered dropping out, warned her of the consequences and shored up her confidence. His contributions went well beyond these discussions, however. During Andreya's involvement with Early Head Start, Rickie taught her how to manage her temper and her time, encouraged her to set and work toward attainable goals, helped her navigate the social service system, and served as her advocate with the Job Corps staff. He also provided gentle advice regarding her relationships with her children, her mother, her brothers, and her children's father. This support helped Andreya become the only one in her family to graduate from high school.

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[1] All names are fictitious.

[2] Job Corps is a federally funded program that provides high school education plus job training. To earn the high school degree, students must complete all high school requirements plus all requirements for their "trade"–the job-specific training.

BOX V.21

VALIDATION OF NATIONAL CHILD LANGUAGE MEASURES AT 14 AND 24 MONTHS[1]

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Harvard Graduate School of Education

Elizabeth Spier, Catherine Tamis-LeMonda, and Mark Spellman
New York University

At the 14- and 24-month data collection points, the Early Head Start national evaluation relied primarily on the MacArthur Communicative Development Inventory (CDI; Fenson et al. 2000) as a measure of children's language development. The CDI is a checklist of age-appropriate language skills (for example, vocabulary comprehension and production, use of gestures, sentence types) that parents complete. Studies of middle-class families indicate that mothers in such families are relatively good judges of their children's language use (Fenson et al. 1994). However, some researchers have questioned the accuracy of reports by low-income mothers or those with lower levels of education (for example, Feldman et al. 2000). Thus, it was important in the current evaluation of Early Head Start to ascertain how accurately mothers in the study assessed their children's vocabulary.

Research teams at Harvard Graduate School of Education and at New York University Graduate School of Education transcribed and analyzed parent-child discourse observed during the videotaped semistructured play activity (combined sample at two sites: n = 161 at 14 months, n = 158 at 24 months). Approximately 45 percent of the mothers identified themselves as white, 25 percent as African American, and 17 percent as Hispanic. Transcribed spontaneous speech yielded two measures of child language use that we focus on here: the number of different words (*word types*) produced by the child and the number of *total words* spoken by the child.

We examined associations between child spontaneous speech measures (*word types, total words*), parent report measures (CDI scores), and children's performance on structured cognitive and language assessments (Bayley scores). Note that parents were asked to assess children's comprehension only at 14 months and that Bayley Language Factor scores were computed only at 24 months.) Results for the combined sample showed that at 14 months, parental report of children's productive vocabulary correlated moderately well with children's spontaneous vocabulary use as measured by *word types* ($r = .43$, $p < .001$) and *total words* ($r = .39$, $p < .001$). Bayley MDI scores showed no relationship to spontaneous speech measures and only a weak association with CDI production ($r = .17$, $p < .05$). At 24 months, parent report of child language was strongly associated with both spontaneous speech measures (*word types*: $r = .53$, $p < .001$; *total words*: $r = .40$, $p < .001$) and with structured assessments (Bayley MDI: $r = .52$, $p < .001$; Bayley Language Factor: $r = .61$, $p < .001$). These general patterns were found for families in both sites and across ethnic groups, although Hispanic mothers' report of child productive vocabulary was not associated with child *word types* at 24 months, possibly due to the small sample size ($n = 27$).

Regression analyses using maternal report of children's productive vocabulary to predict children's spontaneous vocabulary use (*word types*) and language performance on the Bayley Language Factor confirm that low-income parents accurately report their children's language development, particularly at 24 months. At age 2, parental report alone accounted for 27.5 percent of variation in child *word types* and 37.5 percent in Bayley Language Factor scores. Controlling for maternal education, child gender, and birth order, the variation accounted for by maternal report increased to 31.3 percent for *word types* and to 39.9 percent for Bayley Language Factor.

These results suggest that low-income parents' reports are congruent with observed measures of children's language development and that parental report of toddlers' productive vocabulary at 24 months, as reported in the national evaluation's interim report is a valid outcome measure of program impacts on child language development (ACYF 2001).

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[1] See full report in Volume III for tables and references.

BOX V.22

ASSOCIATIONS OF MATERNAL AND CHILD ATTACHMENT SECURITY WITH OUTCOMES OF CHILDREN ELIGIBLE FOR EARLY HEAD START

Susan Spieker, Kathryn Barnard, Michelle DeKlyen, and Dana Nelson
University of Washington

In our Early Head Start study, we used "gold standard" attachment measures for both the mothers and children and related these measures to child outcomes. Immediately after random assignment, mothers participated in the Adult Attachment Interview, in which the coherence of their state of mind with respect to attachment relationships was rated on a 9-point scale. "Coherence" is an indicator of security. It is the adult's ability to reflect on memories related to attachment while simultaneously having a clear, understandable, and collaborative conversation with an unfamiliar interviewer. When the children were 19 months old, they were assessed in the "Strange Situation," a separation and reunion paradigm, in which the security of their relationship with the mother was rated on a 9-point scale. Security is the extent to which the infant uses the mother as a source of comfort when distressed and a safe base from which to explore. Both measures are time-intensive and broadly validated.

Based on theory and prior research, we expected that both adult and child attachment security would be protective factors for child outcomes for children eligible for Early Head Start. Thus, we expected that higher security ratings would, in general, predict more positive child language, cognitive, and behavioral outcomes at 24, 30, and 36 months. The outcome measures include Aggressive Behavior (CBCL), Sustained Attention (Semistructured Play), Bayley Mental Development Index, Bayley BRS Orientation Rating, Auditory Comprehension (PLS), Expressive Communication (PLS), and PPVT-III Receptive Vocabulary.

All analyses, which used both the program and comparison groups, consisted of hierarchical regression, in which the mother's verbal ability, as assessed by the vocabulary subtest of a standard IQ test, was entered on the first step. The mother's coherence of mind and child's attachment security were entered on the second and third steps, respectively. Thus, the contribution of coherence of mind was assessed after controlling for the mother's verbal ability (which was correlated .38 with coherence of mind). Unexpectedly, child security was not correlated with the mother's coherence of mind. Further analyses are planned to discover the reasons for this lack of association. Security was not correlated with mother's verbal ability, and it was not expected to be.

Not surprisingly, maternal verbal ability was related to all cognitive and language outcomes. Maternal coherence of mind, usually measured before the birth of the child, was associated with child mental ability and orientation at 24 months and child language comprehension at 30 months, even after controlling for the effect of the mother's own verbal ability. Coherence was also uniquely associated with lower child aggression at 36 months. Finally, child attachment security significantly predicted four cognitive, language, and behavioral scores at 30 and 36 months. These results suggest that the quality of relationships is an important context for child development in the toddler and preschool years. They also suggest that intervention that focuses on relationships, for the mother and, especially, for the mother-child relationship, may have considerable benefit for child behavioral, cognitive, and language development.

BOX V.23

EARLY HEAD START INTERVENTION WITH FAMILIES AND FAMILIES' INVESTMENT IN CHILDREN

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United Cerebral Palsy Early Head Start was a federally funded program that promoted child development through a flexible mixture of child and family services. It served young, economically disadvantaged families with children under age 3. The Early Head Start center was in a suburban commercial strip mall in Northern Virginia and served 73 families living in motels, low-rise apartments, and rental houses within a 10-mile radius of the center. The child-focused services included family- or center-based child care and home visiting. The family-focused services included parent mobilization and links to community services to enable parents to fulfill their parenting roles, achieve family well-being, and move toward economic self-sufficiency. To date, however, little is known about how the United Cerebral Palsy Early Head Start services strengthen family functioning, parental investment in children, and children's social development.

To explore the effect of Early Head Start services, the Catholic University of America research team (1) assessed family needs and aspirations at enrollment; (2) documented the type and amount of Early Head Start services delivered to families; and (3) assessed family functioning and child social development when the enrolled child reached 30 months of age, six months prior to program exit. Next, we explored whether variance in service activities was associated with family status as U.S.-born or immigrant. Finally, we explored whether Early Head Start service activities were congruent with families' needs and aspirations at enrollment, and, in turn, whether these services helped families achieve greater competency in their pre-exit family functioning when the children were 30 months old. We also explored whether family functioning created a greater family investment in the targeted children and, therefore, improved those children's social development at 30 months of age.

Findings from multiple quantitative analyses documented Early Head Start services for 32 immigrant and 41 U.S.-born families and identified an Early Head Start service path for all families. Most of the immigrant families received family child care, home visiting, or a combination of the two child care programs. Half of the 41 U.S.-born families received center-based child care with or without home visiting or family child care, and half received a combination of family child care and home visiting. Immigrant families received more parent mobilization services to match their greater need at enrollment. Both immigrant and U.S.-born families received a similar number of links to the community services they needed. Overall, Early Head Start parent mobilization and linking service activities, as mediated by family status, an assessment of family needs and resources, and aspirations at enrollment, created a path that led to increased pre-exit competence in family functioning. The family status at enrollment and pre-exit functioning further affected families' pre-exit investment in their children. Finally, family pre-exit investment in children and family aspirations at enrollment were reflected in children's sociobehavioral functioning when they turned 30 months of age. Through meeting the sociocultural needs of Early Head Start families at enrollment, the program activities positively influenced both family functioning and child investment. In addition, when they were combined with families' aspirations, these activities influenced children's social development, which was appropriate for their age at 30 months. Further longitudinal study is needed to learn whether these observed effects of Early Head Start services will endure.

VI. VARIATIONS IN IMPACTS BY PROGRAM APPROACH AND PATTERN OF IMPLEMENTING KEY FEATURES OF THE PERFORMANCE STANDARDS

Reflecting the diversity of communities and families they served, the 17 Early Head Start research programs varied in the approaches they took to providing services and in the time it took them to reach full implementation of the Head Start Program Performance Standards. As discussed in Chapter IV, program impacts on the services families received varied significantly when programs were grouped by program approach and by pattern of implementation. Because the pattern of impacts on service receipt and intensity differed across these groups, we expected that program impacts on child and family outcomes might also vary on these dimensions.

To briefly summarize the patterns of impacts on service receipt discussed in Chapter IV, home-based programs had the largest impacts on receipt of home visits, weekly home visits during at least one follow-up period and throughout the entire follow-up period, and participation in parent-child group socialization activities. Center-based programs had relatively larger impacts on the use of center-based child care and weekly out-of-pocket costs of child care. Mixed-approach programs tended to have impacts on service use that were between those of home-based and center-based programs but were often closest in magnitude to the impacts that home-based programs had on service use. Similarly, as expected, programs that implemented key performance standards early had somewhat larger impacts on the receipt of any key services (home visits, center-based care, and case management) and larger impacts on the receipt of core child development services and home visits at the required intensity than programs that were not fully implemented until the later period or were incompletely implemented.

Analyses of differences in impacts on child and family outcomes by program approach and implementation pattern show that while all groups of programs had significant impacts on some child and family outcomes, impacts varied across these groups. When children were 3 years old, mixed-approach programs had a stronger pattern of impacts on child and family outcomes than the other programs, but center-based programs also had some important impacts. Home-based programs had fewer significant impacts. With respect to implementation patterns, all three groups of programs had some favorable impacts on child and family outcomes. However, the early and later implementers had significant favorable impacts on a broader range of outcomes than the incomplete implementers. The early implementers had impacts on depression and employment not found among the other programs. Mixed-approach programs that fully implemented key aspects of the Head Start Program Performance Standards early produced some more-favorable impacts (with some of the largest effect sizes detected in the study) and the home-based programs that were fully implemented either early or later produced favorable impacts on some important outcomes, including children's cognitive and language development.

We also examined some other program- and site-level subgroups to explore whether Early Head Start impacts varied as a function of either urban/rural program location or whether state welfare regulations require parents to engage in work activities while their youngest child is under 1 year old. Neither of these other analyses suggested that they were important ways of classifying programs to examine differences in impacts on services or on children and families. Tables showing the impacts of Early Head Start by these subgroups may be found in Appendix E.VI.

This discussion focuses on several aspects of the subgroup findings. First, we interpret the subgroup impacts in the context of the overall impacts reported in Chapter V. In some cases, although Early Head Start had an overall impact when averaging across all sites, none of the individual subgroup impacts is significant. This may be due, in part, to the substantially smaller sample sizes when examining each subgroup. We interpret such situations to mean that all program approaches contributed to the overall impact. In interpreting these findings, we also take effect sizes into account, and in order to understand patterns of effects, we describe program-control differences as "favorable" when effect sizes are larger. Interpretation of subgroup findings is also aided by the chi-square test, which is statistically significant if the program-control differences differ across the three subgroups. A significant chi square does not always tell us where that difference lies, however, so that is a matter of interpretation. Finally, we consider patterns across outcome variables within clusters of outcomes (child cognitive and language, child social-emotional, parenting, and so forth). Given these considerations, our approach to interpreting subgroup effects is necessarily more complex than to reporting overall impacts as in Chapter V. For example, we note relatively large impacts even when they are not statistically significant so as to identify patterns of findings, and note this in the text so that readers may form their own conclusions. By considering (1) the overall (full-sample) impacts, (2) impacts within each subgroup, (3) the magnitude of the program-control differences, (4) the chi-square statistic, and (5) patterns of differences within clusters of outcomes for a particular subgroup and for a single outcome across subgroups, we draw our interpretations with respect to the meaning of the findings for Early Head Start programs and policy.

The following sections discuss variations in program impacts on child development, parenting, and family well-being by program approach and implementation pattern. The final section draws conclusions from these findings.

A. HOW CHILD DEVELOPMENT, PARENTING, AND FAMILY WELL-BEING IMPACTS VARIED BY PROGRAM APPROACH

As described in Chapter I, the Early Head Start programs adopted three main approaches to providing child development services based on the needs of children and families in their communities.[1] Home-based programs provided these services primarily through frequent home visits, as well as through parent-child group socialization activities. Center-based programs provided child development services primarily through child care in Early Head Start centers supplemented by parenting education and family support services. Mixed-approach programs provided home-based services to some families, center-based services to some families, and a mix of home- and center-based services to some families. This mix of services could occur across different families or across time with the same families, depending on how the program designed its services to meet families' needs (see Chapter I). Regardless of the pattern of services, home visits and child care in Early Head Start centers were the two primary vehicles through which programs delivered child development services.

In 1997, four programs took a center-based approach; seven programs took a home-based approach; and six programs took a mixed approach. By 1999, home-based and center-based programs were beginning to offer a greater mix of services in response to the changing needs of families and children in the program. In particular, some home-based programs began offering some center-based care to families that needed it, either directly or by partnering with local, good-quality infant/toddler care providers. Few research families used the new center-based slots, however. Other home-based programs began working with child care providers to improve the care offered to program children. Because the impacts on service use continued to differ according to programs' approaches to service delivery in 1997, we examined differences in impacts on child and family outcomes according to the programs' approaches in 1997.

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[1] As we stated in Chapter I, programs that primarily offer services to families through the home-based option, for purposes of discussion, are called "home-based programs" in this report. Those offering services to families through the center-based option are referred to as "center-based programs" for this report, and those programs that serve families through various

Program approaches were not randomly determined, but instead, Early Head Start programs chose program approaches and an array of services that were most appropriate for their communities and the families they expected to serve. Family characteristics differed by program approach (as discussed in Chapter II) as did the communities in which the programs operated and the programs' patterns and levels of implementation. As a result, the pattern of impacts by program approach should not be interpreted as a test of which program approach is most effective but as a test of the effectiveness of each approach among programs that chose that approach.

In this section, we discuss the impacts of Early Head Start by program approach, presenting the impacts in three subsections—child development, parenting, and parents' physical and mental health and self-sufficiency. In discussing the subgroup findings below, we focus on several different aspects of the findings.

1. Child Development

When children were 3 years old, impacts on children's cognitive, language, and social-emotional development were favorable and statistically significant overall. For most child development outcomes, the program impacts did not differ significantly by program approach. Mixed-approach programs had a somewhat stronger pattern of favorable impacts on children with significant effect sizes in the 20 to 30 percent range, although center-based and home-based programs also had some important impacts (see Table VI.1). Impacts on the Bayley Mental Development Index (MDI) at age 3 (reported in Chapter V) did not differ significantly by program approach. While the impacts on the proportion of children scoring below 85 on the

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(continued)
combinations of home- and center-based options are referred to as "mixed-approach programs" in this report.

TABLE VI.1

IMPACTS ON CHILD OUTCOMES AT AGE 3, BY PROGRAM APPROACH

	Center-Based Programs				Mixed-Approach Programs				Home-Based Programs			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]
Child Cognitive and Language Development												
Bayley Mental Development Index (MDI) Standard Score	89.8	88.9	0.9	7.2	89.3	87.9	1.4	10.9	94.1	92.8	1.2	9.5
Percentage with MDI < 85***[d]	26.5	36.1	-9.7	-20.7	36.1	38.4	-2.2	-4.8	20.5	22.0	-1.4	-3.1
Peabody Picture Vocabulary Test (PPVT-III) Standard Score	83.2	81.8	1.5	9.1	82.2	78.5	3.7**	22.6	84.6	83.1	1.5	9.1
Percentage with PPVT-III < 85***	52.4	54.7	-2.3	-4.5	56.0	67.7	-11.6**	-23.3	45.6	48.6	-3.0	-6.1
Child Social-Emotional Development												
Engagement of Parent During Parent-Child Semistructured Play	4.9	4.7	0.2	17.4	4.7	4.4	0.3***	29.5	4.8	4.6	0.2**	19.2
Sustained Attention with Objects During Parent-Child Semistructured Play	5.0	5.0	0.0	0.5	5.0	4.7	0.3***	30.8	5.0	4.9	0.1	10.6
Engagement of Parent During Parent-Child Puzzle Challenge Task	5.0	4.9	0.1	8.0	5.0	4.9	0.1	14.2	5.1	5.0	0.1	5.6
Persistence During Parent-Child Puzzle Challenge Task	4.4	4.3	0.1	9.1	4.5	4.4	0.0	3.5	4.7	4.6	0.1	12.0
Bayley Behavioral Rating Scale (BRS): Emotional Regulation	4.0	4.0	0.0	1.1	4.0	4.1	-0.1	-7.9	4.0	4.0	0.0	2.1
Bayley BRS: Orientation/ Engagement	3.9	3.9	0.1	9.6	3.9	3.9	-0.1	-9.5	3.9	3.8	0.0	3.4
Negativity Toward Parent During Parent-Child Semistructured Play	1.2	1.4	-0.2**	-27.1	1.3	1.3	-0.1	-15.3	1.3	1.3	-0.0	-6.6
Frustration During Parent-Child Puzzle Challenge Task	2.5	2.7	-0.2	-14.9	2.8	2.7	0.1	10.3	2.7	2.6	0.1	5.9
Child Behavior Checklist—Aggressive Behavior	9.6	10.8	-1.2	-18.1	10.7	11.3	-0.6	-9.3	11.2	11.7	-0.5	-7.8
Child Health Status												
Child's Health Status	3.9	4.1	-0.2	-17.1	4.1	4.1	0.0	2.3	4.0	4.0	-0.0	-4.0
Percentage of Children in Fair or Poor Heath***	9.9	6.7	3.2	11.1	5.4	6.0	-0.6	-2.1	9.8	9.6	0.2	0.8
Sample Size												
Bayley	217	172	389		266	257	523		396	350	746	
Parent Interview	254	211	465		351	344	695		502	448	950	
Parent-Child Interactions	227	181	408		251	255	506		396	348	744	

SOURCE: Parent interviews, child assessments, interviewer observations, and assessments of semistructured parent-child interactions conducted when children were approximately 36 months old.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

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Table V1.1 (*Continued*)

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control-group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

Bayley MDI were not statistically significant in any of the three groups, center-based programs had a significantly stronger favorable impact on the proportion of children scoring below 85 than the other programs. When children were 2 years old, the Early Head Start impacts on cognitive development were more strongly associated with center-based programs than was true when children were 3 years old.

Impacts on children's receptive vocabulary scores (PPVT-III) did not differ significantly across program approaches; however, only the impact for mixed-approach programs was large enough to reach statistical significance. Mixed-approach programs also reduced the proportion of children with receptive vocabulary scores below 85 significantly and to a significantly greater extent than did other programs. The stronger impacts on language development among mixed-approach Early Head Start programs are consistent with the interim findings when children were 2 years old.

Among the positive aspects of children's social-emotional development at age 3, the impacts of Early Head Start on observational measures of behavior were generally in a favorable direction and not significantly different across program approaches. One impact among home-based programs and two impacts among mixed-approach programs reached statistical significance. Early Head Start had a significant positive impact on children's engagement of the parent in semistructured play in home-based and mixed-approach programs. The impact on this outcome among children in center-based programs was relatively large, but not statistically significant. Early Head Start also led to significantly greater sustained attention with objects in semistructured play among children in mixed-approach programs.

When children were 3 years old, the favorable impacts of Early Head Start on positive aspects of children's behavior were similar to those found at age 2 among mixed-approach programs. The favorable impact at age 3 on children's engagement of their parents in play among home-based programs, however, was not found when children were 2.

Among the negative aspects of children's social-emotional development at age 3, the impacts of center-based Early Head Start programs tended to be consistently favorable. Although the differences in impacts across program approaches were not statistically significant, center-based programs significantly reduced negativity toward the parent in semistructured play. Moreover, the center-based programs tended to reduce parent-reported aggressive behavior and frustration in the puzzle challenge task, but these impacts were not large enough to reach statistical significance.

The pattern of stronger favorable impacts of center-based programs on negative aspects of children's social-emotional behavior is somewhat different from the pattern we found when children were 2 years old. The impacts of the mixed-approach programs on negative behaviors were more favorable at age 2, and the reduction in aggressive behavior was statistically significant among the mixed-approach programs. At age 2, the impacts of center-based programs on aggressive behavior were favorable but not statistically significant.

These findings suggest that the favorable overall impacts of Early Head Start on children's cognitive development, language development, aggressive behavior, and behavior in relation to the parent during semistructured play did not differ greatly across program approaches. However, mixed-approach programs appear to have had greater impacts on language development and on positive aspects of social-emotional behavior, while center-based programs tended to have favorable impacts on the cognitive development of children with mild delays and on one negative aspect of children's social-emotional behavior.

2. Parenting

Early Head Start had favorable impacts on important aspects of parenting when children were 3 years old across all three program approaches, but impacts appeared to be stronger (with effect sizes often in the 20 to 30 percent range) and more consistent across a broad range of parenting behavior for parents in mixed-approach programs (Table VI.2). This finding is consistent with the pattern of impacts reported for parents when children were 2 years old (ACYF 2001).

When children were 3 years old, Early Head Start had a favorable overall impact on the organization, stimulation, and support provided in the home environment, as measured by the total HOME score. For each program approach, the impact of Early Head Start on total HOME scores was favorable, but not statistically significant. In contrast, when children were 2, only home-based and mixed-approach programs had favorable impacts on the total HOME score.

When children were 3 years old, the overall impacts of Early Head Start on emotionally supportive parenting were generally favorable and did not differ significantly across program approaches. Parents in home-based and mixed-approach Early Head Start programs were rated as more supportive toward their child in semistructured play than control-group parents in those sites, and the impacts were statistically significant. When children were 2 years old, favorable impacts on emotional support also occurred within both home-based and mixed-approach programs, and were statistically significant in most cases. Impacts on aspects of stimulation of children's cognitive and language development were generally more favorable among parents in mixed-approach programs. Several impacts in this area were favorable for parents in center-based programs, but only one reached statistical significance. The home-based programs did not have any impacts on support for children's cognitive and language development. Among parents in mixed-approach programs, Early Head Start had a significant impact on the quality of

TABLE VI.2

IMPACTS ON PARENTING OUTCOMES AT AGE 3, BY PROGRAM APPROACH

	Center-Based Programs				Mixed-Approach Programs				Home-Based Programs			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]
Quality of the Home Environment and Parenting: Overall and Physical Environment												
Home Observation for Measurement of the Environment (HOME) Total Score	27.3	26.4	0.9	18.8	27.0	26.4	0.6	11.3	28.3	28.1	0.2	3.5
HOME Internal Physical Environment	7.7	7.5	0.1	8.6	7.7	7.8	-0.1	-3.7	8.0	8.0	-0.0	-1.6
Quality of the Home Environment and Parenting: Emotional Support												
HOME Warmth	2.6	2.4	0.1	15.4	2.4	2.3	0.1	9.3	2.7	2.7	-0.0	-0.8
Supportiveness During Parent-Child Semistructured Play	4.1	4.0	0.1	8.9	4.0	3.8	0.2**	20.8	4.0	3.9	0.1**	15.5
Supportive Presence During Parent-Child Puzzle Challenge Task	4.5	4.5	-0.1	-4.2	4.4	4.2	0.2	14.7	4.6	4.5	0.1	7.3
Quality of the Home Environment and Parenting: Stimulation of Language and Learning												
Percentage of Children with a Regular Bedtime***	58.7	57.0	1.8	3.6	59.3	62.4	-3.1	-6.2	59.3	55.6	3.6	7.4
Percentage of Children Who Follow a Bedtime Routine*	67.1	66.1	1.0	2.2	67.9	66.8	1.1	2.4	72.0	71.0	1.0	2.2
HOME: Support of Language and Learning	10.7	10.5	0.3	13.0	10.3	10.1	0.2	9.2	10.9	10.7	0.2	7.0
Parent-Child Play**[d]	4.6	4.3	0.2*	25.7	4.4	4.2	0.2*	18.1	4.4	4.4	-0.1	-5.5
Quality of Assistance During Parent-Child Puzzle Challenge Task	3.6	3.5	0.0	3.7	3.6	3.3	0.3**	24.8	3.6	3.5	0.0	2.7
Percentage of Parents Who Read to Child Daily***	57.9	50.8	7.0	14.1	59.0	45.0	14.0***	28.0	54.5	55.7	-1.2	-2.4
Percentage of Parents Who Read to Child at Bedtime***	30.6	32.4	-1.7	-3.8	36.7	30.8	5.9	13.0	29.6	25.8	3.8	8.4
Quality of the Home Environment and Parenting: Negative Parenting Behavior												
Detachment During Parent-Child Semistructured Play**	1.2	1.1	0.1	16.2	1.2	1.4	-0.2**	-23.8	1.2	1.3	-0.1	-9.4
Intrusiveness During Parent-Child Semistructured Play	1.5	1.6	-0.1	-13.9	1.6	1.7	-0.0	-3.3	1.6	1.6	-0.1	-6.4
Detachment During Parent-Child Puzzle Challenge Task	1.6	1.6	0.0	4.7	1.7	1.9	-0.2	-16.4	1.6	1.6	-0.0	-3.5
Intrusiveness During Parent-Child Puzzle Challenge Task	2.8	2.7	0.1	4.3	2.8	2.9	-0.1	-10.8	2.5	2.6	-0.1	-8.7
Negative Regard During Parent-Child Semistructured Play	1.3	1.3	0.0	1.2	1.3	1.3	0.0	6.0	1.2	1.3	-0.1	-9.5
HOME Harshness	0.3	0.3	0.0	3.3	0.2	0.2	0.0	1.1	0.3	0.3	0.0	5.6
Percentage of Parents Who Spanked Child in the Past Week***	51.4	61.0	-9.6	-19.2	46.6	57.6	-10.9**	-21.9	44.1	49.6	-5.5	-10.9

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Table VI.2 (*Continued*)

	Center-Based Programs				Mixed-Approach Programs				Home-Based Programs			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]
Knowledge of Child Development, Discipline Strategies, and Safety Practices												
Percentage of Parents Who Usually Use a Car Seat Correctly***	63.0	75.3	-12.3**	-26.8	73.7	71.6	2.2	4.7	70.4	69.4	1.0	2.2
Percentage of Parents Suggesting Physical Punishment as a Discipline Strategy***	52.0	60.6	-8.6	-17.2	43.9	53.5	-9.6**	-19.2	44.9	44.5	0.4	0.8
Percentage of Parents Who Would Use Mild Discipline Only***	36.8	30.9	5.9	11.9	49.2	39.1	10.1***	20.5	45.8	45.9	-0.1	-0.2
Index of Severity of Discipline Strategies	3.6	3.9	-0.2	-14.0	3.2	3.6	-0.4***	-22.6	3.3	3.3	-0.0	-1.8
Sample Size												
Parent Interview	**254**	**211**	**465**		**351**	**344**	**695**		**502**	**448**	**950**	
Parent-Child Interactions	**227**	**181**	**408**		**251**	**251**	**506**		**396**	**348**	**744**	

SOURCE: Parent interviews, child assessments, interviewer observations, and assessments of semistructured parent-child interactions conducted when children were approximately 36 months old.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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assistance provided to the child during the puzzle challenge task, the number and frequency of parent-child play activities, and whether the parent read to the child every day. Center-based Early Head Start programs had a favorable impact on the number and frequency of parent-child play activities.

When children were 3 years old, parents in mixed-approach programs were significantly less detached from the child in semistructured play than control-group parents. In contrast, parents in center-based programs tended to show greater detachment during semistructured play compared with their control-group counterparts, although this difference also was not statistically significant.

Participation in Early Head Start center-based and mixed-approach programs led parents to reduce physical punishment, both the incidence of spanking in the past week as reported by the parent and physical punishment as a reported discipline strategy. The impacts of the mixed-approach programs on these outcomes were statistically significant, and while not statistically significant, the effect sizes for impacts on these outcomes for parents in center-based programs were comparable to those of the mixed-approach programs. This finding suggests that mixed-approach and center-based Early Head Start programs may offer more information or different types of services that help to educate parents and reduce physical punishment.

A perplexing finding emerged with regard to the safe and consistent use of car seats. Although Early Head Start had no overall effect on car seat safety, Early Head Start parents in center-based programs were significantly *less* likely than their control-group counterparts to report using car seats consistently and safely. This finding could have emerged by chance, but it is consistent with a pattern of unfavorable impacts on safety practices at age 2 and might suggest that center-based programs need to focus on car-seat safety practices.

Thus, when children were 3 years old, Early Head Start had favorable impacts on a wide range of important parenting behaviors for parents in mixed-approach programs, including emotional support, stimulation of language and learning, levels of negative parenting behavior, and punitive discipline strategies. For parents in center-based programs, a pattern emerged in which Early Head Start also enhanced some important aspects of emotional support and support for cognitive and language development and reduced reported use of physical punishment (although, perhaps because the sample size in this subgroup was smaller, many of these impacts were not statistically significant). These results are broadly consistent with the findings when children were 2 years old. However, in contrast to the findings at age 2, when there were several important statistically significant impacts on parents in home-based Early Head Start programs, there was only one significant impact (on supportiveness of the child during semistructured play) for parents in home-based programs when children were 3 years old. Other impacts that were significant at age 2 remained favorable but were no longer statistically significant at age 3.

3. Parents' Physical and Mental Health and Self-Sufficiency

Although Early Head Start had no overall impact on parents' mental health or family conflict when children were 3, within subgroups by program approach, the programs did have some impacts (Table VI.3). Parents in home-based programs reported significantly lower levels of parental distress than their control-group counterparts and, although the impacts were not large enough to be statistically significant, Early Head Start also appeared to reduce parental distress among parents in mixed-approach and center-based programs. This finding is broadly consistent with the significant favorable impact on parental distress among mixed-approach programs and the favorable, though not significant, impact found among home-based programs when children were 2 years old.

TABLE VI.3

IMPACTS ON PARENT PHYSICAL AND MENTAL HEALTH AT THE 36-MONTH ASSESSMENT, BY PROGRAM APPROACH

	Center-Based Programs				Mixed-Approach Programs				Home-Based Programs			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]
Parent Physical and Mental Health												
Parent's Health Status	3.5	3.5	-0.0	-2.5	3.5	3.5	-0.1	-5.3	3.4	3.4	-0.1	-5.9
Parenting Stress Index (PSI) Parental Distress	23.9	25.0	-1.1	-11.7	24.8	25.9	-1.1	-11.2	24.9	26.3	-1.4**	-14.4
PSI Parent-Child Dysfunctional Interaction	17.6	17.2	0.4	7.0	18.1	17.7	0.4	6.7	17.5	18.1	-0.6	-10.4
Center for Epidemiological Studies Depression (CES-D; Short Form)	7.3	7.1	0.2	2.6	7.2	7.8	-0.6	-8.2	7.7	7.9	-0.1	-1.8
CES-D Severe Depressive Symptoms ***[d]	15.8	8.7	7.1*	19.8	14.2	15.3	-1.2	-3.2	14.4	16.1	-1.6	-4.5
Family Environment Scale (FES): Family Conflict	1.6	1.7	-0.1	-11.1	1.7	1.7	-0.0	-4.6	1.7	1.7	-0.0	-0.8
Sample Size												
Parent Interview	**254**	**211**	**465**		**351**	**344**	**695**		**502**	**448**	**950**	
Parent-Child Interactions	**227**	**181**	**408**		**251**	**255**	**506**		**396**	**348**	**744**	

SOURCE: Parent interviews, child assessments, interviewer observations, and assessments of semistructured parent-child interactions conducted when children were approximately 36 months old.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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At the same time, Early Head Start programs had an unfavorable impact on reported feelings of depression among parents in center-based programs. While average levels of depressive symptoms were unchanged, the proportion of parents with severe depressive symptoms was significantly higher among parents in the center-based program group compared with the control group, which had relatively low rates of severe depression when children were 3. Impacts on other aspects of parenting that might also be expected to be unfavorable due to the increase in depressive symptoms were not unfavorably affected (for example, supportiveness and intrusiveness during play). When children were 2 years old, we did not find higher levels of depression among parents in center-based programs using a different measure of depression.[2] When children were 3, there were no significant impacts on reported feelings of depression in mixed-approach and home based-programs, where base rates of symptoms of severe depression were about twice as high as those in center-based sites.

All three program approaches had at least some positive impacts on participation in education and training activities during the follow-up period (Table VI.4). Home-based and mixed-approach programs had a significant positive impact on the proportion ever participating in education and training programs. The mixed-approach programs had a significantly larger impact than the other programs. Among parents in home-based programs, most of this activity focused on high school education. Among parents in mixed-approach programs, the activity was

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[2] When children were 2 years old, we measured depression using the Composite International Diagnostic Interview (CIDI) – Short Form - Major Depression (Nelson et al. 1998), from which a probability of clinical depression can be derived. When children were 3 years old, we used the short form of the Center for Epidemiological Studies – Depression (CES-D) scale (Radloff et al. 1977; Ross et al. 1983), which measures depressive symptoms and uses cutoff points to indicate a high probability of clinical depression. Although several of the symptom questions are similar, the reporting period differs (CIDI asks about the past year and CES-D asks about the previous week). The two measures could thus classify the same individual differently.

TABLE VI.4

IMPACTS ON SELF SUFFICIENCY AT 28 MONTHS, BY PROGRAM APPROACH IN 1997

	Center-Based Programs				Mixed-Approach Programs				Home-Based Programs			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]
Education/Job Training												
Ever in Education or Training***[d]	65.1	61.5	3.6	7.2	65.1	51.3	13.8***	27.7	53.1	45.5	7.6**	15.3
Ever in High School***	13.1	11.6	1.5	5.2	15.1	10.6	4.6*	16.0	12.6	6.8	5.7***	20.1
Ever in ESL Class***	1.5	2.7	-1.3	-8.9	5.0	3.3	1.7	11.9	3.4	2.4	1.0	7.2
Ever in Vocational Program***	19.3	17.9	1.5	3.9	22.7	17.6	5.1	13.6	18.2	15.7	2.5	6.6
Average Hours per Week in Education or Training	5.4	5.0	0.5	7.1	4.2	3.3	0.9*	14.5	4.5	3.0	1.6***	24.3
In Education or Training:												
1st Quarter***	24.9	29.6	-4.6	-11.2	22.5	19.0	3.4	8.3	21.2	21.6	-0.4	-1.0
2nd Quarter***	31.4	34.7	-3.3	-7.7	27.1	22.1	5.1	11.8	25.1	22.9	2.2	5.0
3rd Quarter***	37.7	31.7	6.0	13.6	31.3	24.9	6.5*	14.7	28.2	26.5	1.7	3.8
4th Quarter***	38.0	31.0	6.9	16.2	31.4	25.0	6.5*	15.1	27.1	22.5	4.6*	10.7
5th Quarter***	35.5	30.2	5.2	12.1	29.8	27.1	2.8	6.4	28.6	22.9	5.8**	13.4
6th Quarter***	34.3	27.8	6.5	15.6	27.5	23.2	4.4	10.5	28.7	21.3	7.4***	17.9
7th Quarter***	31.2	28.7	2.5	6.3	26.5	23.5	3.0	7.5	23.1	17.6	5.5**	13.7
8th Quarter***	29.3	28.2	1.1	2.9	27.6	20.4	7.2*	18.4	24.3	15.6	8.7***	22.1
Have High School Diploma ***	52.4	13.3	-0.5	-1.5	50.2	48.9	1.3	2.5	49.1	45.7	3.5	6.9
Have GED***	12.8	56.9	-4.6	-9.1	10.1	8.4	1.7	5.5	8.5	11.5	-2.9	-9.2
Employment												
Ever Employed***	91.3	87.3	4.1	10.8	88.6	82.0	6.6**	17.5	83.1	81.8	1.3	3.5
Average Hours/Week Employed	21.6	21.3	0.3	2.1	16.8	15.6	1.2	7.9	14.8	15.1	-0.3	-2.0
Employed in:												
1st Quarter***	53.4	49.4	4.0	8.2	35.5	35.6	-0.1	-0.2	33.8	36.1	-2.2	-4.6
2nd Quarter***	59.4	54.5	4.9	9.8	45.3	41.8	3.5	7.0	38.2	42.9	-4.7	-9.5
3rd Quarter***	63.5	58.9	4.6	9.3	52.8	50.0	2.8	5.7	46.9	50.1	-3.3	-6.5
4th Quarter***	66.4	63.3	3.1	6.2	56.4	52.6	3.8	7.6	51.9	51.7	0.2	0.3
5th Quarter***	71.0	66.4	4.6	9.4	60.3	55.1	5.3	10.7	57.7	58.9	-1.2	-2.4
6th Quarter***	71.3	66.7	4.7	9.5	62.3	55.5	6.8	13.8	61.7	58.2	3.5	7.0
7th Quarter***	64.0	64.9	-0.9	-1.9	61.2	53.7	7.5*	15.1	57.5	55.0	2.4	4.9
8th Quarter***	70.4	67.3	3.1	6.4	67.2	56.8	10.4**	21.3	55.9	59.9	-4.0	-8.1
Any Self-Sufficiency-Oriented Activity (Education, Training, or Employment)												
Ever Employed or in Education/Training***	97.7	94.6	3.1	10.1	95.6	90.1	5.5**	18.2	90.5	88.9	1.6	5.4
Average Hours per Week in Any Activity	28.2	26.8	1.4	8.9	21.3	19.2	2.1	13.6	19.9	18.5	1.3	8.5
In Activities in:												
1st Quarter***	68.0	67.9	0.1	0.2	51.0	48.1	3.0	5.9	47.3	48.4	-1.1	-2.2
2nd Quarter***	78.9	72.8	6.1	12.3	61.8	54.1	7.7**	15.5	53.4	55.5	-2.1	-4.2
3rd Quarter***	83.8	76.1	7.6*	16.1	70.4	63.3	7.1*	14.9	62.3	62.9	-0.6	-1.3
4th Quarter***	86.1	75.9	10.2**	21.4	71.7	64.5	7.2*	15.0	65.2	61.6	3.6	7.6
5th Quarter***	85.4	78.5	6.8	14.8	73.8	67.1	6.7*	14.5	69.6	67.9	1.7	3.6
6th Quarter***	88.2	76.3	12.0**	25.5	74.5	65.7	8.8**	18.6	72.9	66.4	6.5**	13.9

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TABLE VI.4 *(continued)*

	Center-Based Programs				Mixed-Approach Programs				Home-Based Programs			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]
7th Quarter***	81.1	76.1	5.0	10.5	71.7	64.1	7.6*	16.0	66.4	62.7	3.7	7.6
8th Quarter***	84.8	77.2	7.6	16.3	77.2	65.1	12.1***	25.9	65.2	66.6	-1.4	-3.1
AFDC/TANF Receipt												
Ever Received AFDC/TANF***	32.7	28.6	4.1	8.2	46.8	45.7	1.1	2.2	55.2	52.5	2.7	5.5
Received AFDC/TANF in:												
1st Quarter***	21.4	18.2	3.2	6.9	32.9	29.6	3.3	7.0	42.2	29.4	2.7	5.8
2nd Quarter***	28.1	17.8	3.4	7.1	34.5	32.4	2.1	4.5	41.9	42.4	-0.5	-1.1
3rd Quarter***	19.1	20.8	-1.7	-3.5	36.9	33.0	3.9	8.1	46.2	43.9	2.3	4.7
4th Quarter***	18.3	17.4	0.8	1.8	30.4	26.5	3.8	8.2	37.2	38.1	-0.9	-1.9
5th Quarter***	18.0	14.7	3.3	7.2	30.0	27.0	3.0	6.5	36.0	37.8	-1.8	-3.9
6th Quarter***	19.4	16.0	3.4	7.4	26.6	26.7	-0.0	-0.1	36.4	38.5	-2.1	-4.5
7th Quarter***	14.4	14.5	-0.0	-0.0	23.1	23.1	-0.1	-0.1	27.4	32.1	-4.7*	-10.8
8th Quarter***	15.5	13.0	2.5	5.9	19.9	23.6	-3.7	-8.6	27.8	27.8	0.0	0.0
Total AFDC/TANF Benefits ($)	$908.1	$766.6	$141.6	3.7	$2,331.2	$2,111.3	$219.9	5.7	$2,675.5	$2,833.8	-$158.2	-4.1
Receipt of Other Welfare Benefits												
Ever Received Welfare***	63.0	62.6	0.3	0.7	66.0	64.0	2.0	4.3	72.9	70.5	2.5	5.2
Total Welfare Benefits ($)	$3,963.1	$4,478.1	-$515.0	-6.8	$5,422.1	$5,850.6	-$428.5	-5.7	$5,928.6	$6,088.8	-$160.3	-2.1
Ever Received Food Stamps***	53.9	53.2	0.7	1.5	58.2	56.5	1.7	3.5	66.7	65.4	1.3	2.6
Total Food Stamp Benefits ($)	$1,636.1	$1,994.3	-$358.2	-13.2	$2,151.7	$2,022.5	$129.1	4.7	$2,297.8	$2,152.5	$145.3	5.3
Income/Poverty												
Income Above Poverty Level***	47.8	51.0	-3.2	-6.5	41.9	43.5	-1.6	-3.3	41.1	40.8	0.3	0.5
Subsequent Births												
Subsequent Birth by 24 Months After Random Assignment***	15.1	18.9	-3.8	-8.4	24.6	30.5	-5.9	-13.2	26.3	28.4	-2.1	-4.7
Sample Size	**230**	**204**	**434**		**358**	**354**	**712**		**488**	**453**	**941**	

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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a mix of high school and vocational education. The home-based and mixed-approach programs also increased parents' average hours per week in education and training programs significantly, although the impacts were small in terms of hours.

Program impacts on quarterly participation rates in education and training programs were favorable during several quarters of the follow-up period for all three subgroups by program approach. Impacts were statistically significant among mixed-approach programs in quarters 3 and 4; in quarters 4 through 8, impacts were statistically significant among home-based programs. Impacts among center-based programs were comparable in size to those of the other two program approaches in quarters 3 through 6, but were not statistically significant.

Early Head Start mixed-approach programs had a significant positive impact on the proportion of parents who were ever employed, with most of the difference in employment occurring during the second year after enrollment. Impacts on quarterly employment rates were significant among parents in mixed-approach programs in quarters seven and eight. Early Head Start had no statistically significant impact on employment among parents in either center-based or home-based programs, although the impact of center-based programs on employment was favorable. It is possible that the capacity of mixed-approach programs to match parents with good-quality child care when they were ready to consider working helped to ensure that parents could more successfully make the transition to employment than similar parents in the control group. In contrast, the lack of a significant employment impact among parents in center-based programs may be attributable to a stronger initial attachment to the labor force, as control-group rates of employment were higher among parents in center-based programs than they were for parents in the other two program approaches. The lack of any favorable impact on employment among parents in home-based programs may reflect a greater focus on education activities, as impacts were greatest in this area among home-based programs, particularly in the second year after enrollment.

4. Exploring the Relationships Between Parenting Impacts When Children Were 2 and Child Impacts When Children Were 3 by Program Approach

Early Head Start programs that chose different approaches to service delivery typically also had different theories of change regarding how the program would intervene in children's lives.[3] Center-based programs, which offered center-based child development services as well as parent education, expected changes in children's development to occur mainly through the direct services, with a lesser impact of the program occurring through changes in parenting. Home-based programs focused child development services on both the child and the parent, and these programs expected changes in children's development to occur mainly through changes in parenting. Mixed-approach programs, which blended center-based and home-based services in different patterns, varied in terms of the extent to which they expected program effects on children to be mediated by impacts on parents. To explore whether the impacts on parenting when children were 2 years old and on children's development when they were 3 years old are consistent with the program-specific theories of change, we estimated mediated models by program approach that were similar to those estimated for the full sample (discussed in Chapter V and Appendix D.9).[4]

The results of estimating the mediated models for center-based programs are consistent with our expectations. The estimates suggest that impacts on parenting behavior when children were

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[3] See *Pathways to Quality* (ACYF, 2002) for a full presentation of how Early Head Start research programs' theories of change were assessed.

[4] To avoid an overly technical presentation, this section summarizes the results of our analysis of the role of parenting impacts "mediators" when children were 2 years old in relation to the child impacts we observed when children were 3 years old. The methodology of these analyses and the details of the results are presented in Appendix D.9.

2 are related to the impacts on child outcomes at age 3 in the expected directions, but the implied pathway for program impacts through parenting behavior to children appears to be fairly weak, in part because few of the parenting influences were affected by the program in the earlier period. We were able to estimate models of cognitive and language development and aggressive behavior only for children in center-based programs, because most or all of the parenting mediators were not affected by Early Head Start in the earlier period.

For home-based programs, the estimated relationships between impacts on parenting behavior when children were 2 years old and impacts on children's outcomes when they were 3 years old were consistently in the expected directions. Although there was only one statistically significant child outcome among home-based programs when children were 3, the impacts that were not statistically significant were favorable and allowed for successful completion of the mediated analyses. Impacts on supportiveness, cognitive stimulation, and language support when children were 2 years old were all positively related to impacts on cognitive and language development and positive aspects of social-emotional development and inversely related to later impacts on negative aspects of social-emotional development when children were 3 years old. Earlier impacts on intrusiveness, detachment, and parental distress were all inversely related to later impacts on positive aspects of social-emotional development and positively related to later impacts on negative aspects of social-emotional development. Overall, the estimates suggest that part of the Early Head Start impacts on the cognitive, language, and socio-emotional development of children at age 3 in home-based programs could have emerged because of earlier impacts on related parenting behavior.

For mixed-approach programs, the estimated relationships between impacts on parenting behavior when children were 2 years old and impacts on child outcomes a year later were nearly all in the expected directions. Overall, the estimates are consistent with the theory that part of the Early Head Start impact on children's outcomes at age 3 may be mediated by earlier impacts on parenting behavior.

5. Understanding Program Services and Their Impacts

Across all of the program approaches, Early Head Start had favorable impacts on children's cognitive and language development, on levels of aggression, and on behavior in relation to the parent during semistructured play. Nevertheless, the pattern of impacts on children and parents varied to some degree across program approaches, reflecting in part differences in theories of change and impacts on service use, as well as differences in the characteristics of the populations they served.

Mixed-approach programs appear to have had the broadest pattern of favorable impacts on children and families, with many effect sizes in the 20 to 30 percent range. They had greater impacts on children's language development and on positive aspects of social-emotional development. The mixed-approach programs also had statistically significant, favorable impacts on a wider range of parenting behaviors when children were 3 years old, including emotional support, support for children's cognitive and language development, insensitivity, and use of punitive discipline strategies. They also appear to have had larger positive impacts on participation in education and training programs and in the final quarters of follow-up, employment.

Center-based programs appear to have had greater favorable impacts on the cognitive development of children with mild delays and on negative aspects of children's social-emotional development. Parents in center-based programs tended to be more emotionally supportive, provide more support for children's cognitive and language development, and use less punitive discipline strategies than similar parents in the control group. These parents reported a higher incidence of severe depressive symptoms than parents in the control group. Perhaps because parents applying to center-based programs were already planning to work or attend school, there were few statistically significant program impacts on participation in education and training activities or on employment, although the pattern of impacts was favorable.

Fewer statistically significant impacts were found for children and families in home-based programs when children were 3 years old, which suggests some fade-out of impacts on children's language development and parents' support for language and learning that were found when children were 2 years old. At age 3, children were more engaging of the parent in semistructured play and parents showed more supportiveness during the same parent-child play than control group children, but no other impacts on children or parents were large enough to reach statistical significance. Parents in these programs reported lower levels of parental distress than their control-group counterparts.

The different patterns of impacts by program approach may partly relate to different durations of program participation. Parents in mixed-approach programs tended to continue participating in the program for longer periods than did parents in either center-based or home-based programs, and this may have contributed to the somewhat stronger pattern of impacts found at age 3. The differences in duration of program participation by program approach, in turn, could have been influenced by any number of family characteristics, but could also relate to differences in the programs' abilities to flexibly respond to the changing needs of families as their children moved through infancy and toddlerhood and the parents' school or job opportunities changed.

B. HOW CHILD DEVELOPMENT, PARENTING, AND FAMILY WELL-BEING IMPACTS VARIED BY PATTERNS OF IMPLEMENTATION

The 17 programs varied in their patterns of implementing key elements of the Head Start Program Performance Standards pertaining to the quantity and quality of services, based on ratings that were developed for the implementation study.[5] As summarized in Chapter I and reported more fully in *Pathways to Quality* (Administration on Children, Youth, and Families 2002), six programs were rated as fully implemented in fall 1997 (early implementers), six were not rated as fully implemented in fall 1997 but were rated as fully implemented in fall 1999 (later implementers), and five were not rated as fully implemented in either time period (incomplete implementers). The incomplete implementers either emphasized family support (with less emphasis on child development) or faced difficult implementation challenges (such as early staff turnover in leadership positions or partnerships that did not work out well).

We expected early implementers to have stronger and more enduring impacts than later implementers or incomplete implementers. Information about receipt of Early Head Start services (discussed in Chapters III and IV) shows that the impacts on receipt of any core child development services and any home visits were largest for programs that were implemented early and smallest for incomplete implementers. Similarly, the impacts on receipt of core child development services at the required intensity and weekly home visits followed the same pattern.

Because differences in impacts on service receipt correspond to the pattern of implementation in predictable ways, we expected that the program impacts on children and families would also vary according to the pattern of implementation. In particular, we expected that programs that had met the performance standards by a point soon after families enrolled, and sustained full implementation over most of the period that families participated in the program, would have the strongest and most enduring impacts on families and children. Programs that became fully implemented later were expected to have weaker impacts than early implementers, and incomplete implementers were expected to have weaker impacts than later implementers.

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[5] The Head Start Program Performance Standards specify performance criteria that are based on research and consensus from the field about what constitutes high-quality, comprehensive services.

When children were 2 years old, the early implementers had a stronger pattern of impacts on child and family outcomes than later and incomplete implementers. By the 3-year assessment point, however, differences in impacts on children's development and parenting by implementation pattern were less distinct. All three categories of programs had some important impacts when children were 3 years old, but the early and later implementers favorably influenced a broader range of child development and parenting outcomes. This pattern suggests that some experience in a fully-implemented program, even when it occurs later in the families' enrollment period, is sufficient to provide benefits in terms of child development and parenting outcomes (even in the later implementers the families experienced one year or more of full implementation). At the same time, it is notable that early-implemented programs also favorably influenced parents' mental health and self-sufficiency.[6]

Even if the program is not fully implemented overall, fully implementing some key services can make a difference for families and children. Incomplete implementers, many of which had strong family support components, had impacts on self-sufficiency, mental health, and social-emotional aspects of parenting and children's development. Nevertheless, with child development services that did not meet some key program performance standards, these programs had no significant impacts on children's cognitive or language development or on parents' support for children's cognitive and language development.

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[6] We also conducted analyses focusing on the programs that achieved strong full implementation of child and family development services. These analyses are discussed in Chapter II and results are presented in Appendix Table E.VI.9. They show that the four strong fully implemented programs had a stronger pattern of impacts on child and parenting outcomes than the other programs.

It is important to consider that factors other than implementation pattern might also contribute to the differences in impacts for these subgroups. For example, differences in program approaches or family characteristics might be confounded with implementation pattern, as home-based programs seem to have faced more challenges meeting the performance standards than did the other program approaches (ACYF 2002). Within the home-based and mixed-approach programs, it was possible to examine differences in impacts by implementation pattern while holding program approach constant. The results of these analyses provide evidence that fully implementing the performance standards makes a difference.

The following subsections describe the patterns of impacts by pattern of implementation in the areas of child development, parenting, and mental health and self-sufficiency. Then, we present the differences in impacts by implementation pattern when holding program approach constant and discuss the implications of these findings.

1. Child Development

When children were 3, Early Head Start improved a range of child development outcomes; in many cases, these impacts did not differ significantly among the three program groups defined by pattern of implementation (see Table VI.5). Early Head Start had a favorable impact on children's cognitive development among both early and later implementers. Both early and later implementers increased average Bayley MDI scores significantly. The impacts on the percentage of children who scored below 85 (one standard deviation below the average score) were also favorable for children in the early and later-implemented programs, although they were not statistically significant (but the reduction in the percentage below 85 was significant in the overall analysis—see Chapter V).

Early Head Start had a positive impact on the language development of children overall. Program impacts on children's average PPVT-III scores were favorable for Early Head Start

TABLE VI.5

IMPACTS ON CHILD OUTCOMES AT AGE 3, BY PATTERN OF PROGRAM IMPLEMENTATION

	Early Implementers				Late Implementers				Incomplete Implementers			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]
Child Cognitive and Language Development												
Bayley Mental Development Index (MDI) Standard Score	94.1	92.0	2.2*	16.7	88.2	86.0	2.2**	16.9	92.1	92.1	-0.1	-0.4
Percentage with MDI < 85***[d]	24.1	27.0	-5.6	-11.9	36.5	43.1	-6.6	-14.2	23.8	25.8	-2.0	-4.3
Peabody Picture Vocabulary Test (PPVT-III) Standard Score	86.0	84.8	1.3	7.9	78.4	75.2	3.3*	20.0	84.8	83.2	1.6	9.9
Percentage with PPVT-III < 85***	43.1	50.5	-7.5	-15.0	65.4	71.2	-5.8	-11.7	46.6	51.9	-5.3	-10.6
Child Social-Emotional Development												
Engagement of Parent During Parent-Child Semistructured Play	4.9	4.8	0.1	11.1	4.7	4.5	0.2**	22.0	4.9	4.5	0.4***	36.7
Sustained Attention with Objects During Parent-Child Semistructured Play	5.1	5.0	0.1	14.3	4.8	4.7	0.1	13.3	5.0	4.8	0.2*	22.0
Engagement of Parent During Parent-Child Puzzle Challenge Task	5.1	5.0	0.1	7.1	4.9	4.9	0.1	5.3	5.1	4.9	0.2	17.5
Persistence During Parent-Child Puzzle Challenge Task	4.7	4.7	-0.0	-2.0	4.4	4.4	0.1	8.3	4.6	4.4	0.2	19.4
Bayley Behavioral Rating Scale (BRS): Emotional Regulation	4.0	4.0	0.0	2.6	4.0	3.9	0.1	9.1	4.0	4.1	-0.1	-10.5
Bayley BRS: Orientation/ Engagement	4.0	4.0	0.1	8.5	3.6	3.6	0.1	6.8	3.9	3.9	0.0	0.8
Negativity Toward Parent During Parent-Child Semistructured Play	1.2	1.3	-0.1**	-17.7	1.3	1.3	-0.1	-9.3	1.3	1.3	-0.1	-10.6
Frustration During Parent-Child Puzzle Challenge Task	2.8	2.9	-0.0	-2.3	2.6	2.5	0.2	13.6	2.6	2.6	0.0	0.3
Child Behavior Checklist—Aggressive Behavior	11.1	11.8	-0.7	-11.4	10.8	11.0	-0.2	-3.4	9.8	11.6	-1.8***	-28.2
Child Health Status												
Child's Health Status	4.1	4.1	-0.0	-3.4	4.0	3.9	0.1	10.2	4.0	4.1	-0.1	-10.4
Percentage of Children in Fair or Poor Heath***	7.4	6.9	0.4	1.5	8.7	11.4	-2.7	-9.4	8.2	8.1	0.1	0.2
Sample Size												
Bayley	**305**	**298**	**603**		**336**	**277**	**613**		**238**	**204**	**442**	
Parent Interview	**388**	**358**	**746**		**418**	**362**	**780**		**301**	**283**	**584**	
Parent-Child Interactions	**306**	**291**	**597**		**348**	**295**	**643**		**220**	**198**	**418**	

SOURCE: Parent interviews, child assessments, interviewer observations, and assessments of semistructured parent-child interactions conducted when children were approximately 36 months old.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

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Table VI.5 (*Continued*)

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

programs in all three implementation categories and statistically significant among the later implementers. The favorable impacts on the percentage of children with PPVT-III scores below 85 were somewhat larger among early implementers.

Early Head Start programs in all three implementation categories enhanced positive aspects of children's social-emotional behavior, but the pattern of impacts appears particularly strong among incomplete implementers. Early Head Start children in incompletely implemented programs showed significantly greater levels of engagement of the parent in semistructured play and attention to objects during play compared with their control-group counterparts. Impacts on engagement of the parent during semistructured play were also statistically significant for children in later-implemented programs.

According to the analysis of impacts on the full sample (Chapter V), Early Head Start programs had favorable impacts on children's aggressive behavior and negativity toward the parent during semistructured play among all three groups of programs defined by the level and timing of implementation, and the differences in impacts across groups were not statistically significant. The pattern of statistically significant impacts within implementation groups was mixed, however. The favorable impact on parent-reported levels of aggressive behavior was statistically significant among children in incompletely implemented programs, but not in the other two groups. The favorable impact on negativity toward the parent during semistructured play was statistically significant among children in early-implemented programs, but not for the other two implementation groups.

When children were 2 years old, the impacts on children's development were more strongly associated with early-implemented programs. The pattern of impacts across implementation subgroups found when children were 3 years old likely reflects, at least in part, the greater time separation of the implementation measures and the child assessment measures for many families and the fact that most programs in all three groups continued improving services over time.

2. Parenting

When children were 3, Early Head Start impacts on parenting behavior and knowledge were mainly concentrated in early- and later-implemented programs. Very few significant impacts emerged among parents in incompletely implemented programs (Table VI.6). A year earlier, the strongest impacts on parenting behavior and knowledge were concentrated among the early implementers.

At the 3-year-old assessment point, Early Head Start had a favorable impact overall on the cognitive stimulation and emotional support in the home, measured by total HOME scores, but impacts on total HOME scores were statistically significant only among the early implementers. Impacts on the physical environment of the home were not significant for any of the three implementation groups.

When children were 3, Early Head Start had important impacts on aspects of emotional support among parents in all three groups of programs classified by implementation pattern. The Early Head Start impact on parents' warmth toward the child as rated by the interviewer during the home visit was favorable and statistically significant among parents in early-implemented programs. Impacts on parent supportiveness during semistructured play were statistically significant in later-implemented and incompletely implemented programs. The impacts on supportive presence during the puzzle challenge task were not large enough to reach statistical significance in any of the subgroups.

Early Head Start had positive impacts on several aspects of stimulation of language learning among parents in early-implemented and later-implemented programs, but not among parents in incompletely implemented programs. Early Head Start impacts on parent-child play and reading

TABLE VI.6

IMPACTS ON PARENTING OUTCOMES AT AGE 3, BY PATTERN OF PROGRAM IMPLEMENTATION

	Early Implementers				Late Implementers				Incomplete Implementers			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]
Quality of the Home Environment and Parenting: Overall and Physical Environment												
Home Observation for Measurement of the Environment (HOME) Total Score	28.3	27.3	1.0**	19.5	26.3	26.1	0.2	3.9	28.3	27.9	0.5	9.2
HOME Internal Physical Environment	7.9	7.7	0.2	12.2	7.7	7.8	-0.2	-11.5	7.9	7.8	0.1	8.1
Quality of the Home Environment and Parenting: Emotional Support												
HOME Warmth	2.5	2.4	0.2**	18.4	2.5	2.4	0.1	7.2	2.7	2.7	0.0	1.0
Supportiveness During Parent-Child Semistructured Play	4.1	4.1	0.0	4.6	3.8	3.6	0.2**	19.9	4.1	3.8	0.2*	22.6
Supportive Presence During Parent-Child Puzzle Challenge Task	4.9	4.8	0.1	10.7	4.1	4.1	0.0	0.6	4.4	4.4	0.0	2.3
Quality of the Home Environment and Parenting: Stimulation of Language and Learning												
Percentage of Children with a Regular Bedtime***[d]	63.3	63.6	-0.2	-0.4	55.9	51.9	4.0	8.1	59.3	59.9	-0.6	-1.2
Percentage of Children Who Follow a Bedtime Routine***	72.2	70.3	1.9	4.1	66.6	66.3	0.2	0.5	70.0	69.6	0.4	0.9
HOME: Support of Language and Learning	10.8	10.6	0.2	7.8	10.2	9.8	0.3**	16.2	11.0	11.0	0.0	0.2
Parent-Child Play	4.4	4.3	0.1*	13.9	4.4	4.3	0.1	11.6	4.4	4.5	-0.0	-0.7
Quality of Assistance During Parent-Child Puzzle Challenge Task	3.9	3.9	0.1	4.3	3.4	3.2	0.2**	19.7	3.4	3.4	0.0	3.3
Percentage of Parents Who Read to Child Daily***	63.3	52.0	11.3***	22.6	49.5	43.3	6.2	12.3	57.6	58.9	-1.3	-2.7
Percentage of Parents Who Read to Child at Bedtime***	40.9	34.6	6.3	13.9	27.1	20.7	6.5*	14.2	28.1	31.0	-2.8	-6.2
Quality of the Home Environment and Parenting: Negative Parenting Behavior												
Detachment During Parent-Child Semistructured Play	1.2	1.2	0.0	2.0	1.2	1.3	-0.1*	-17.5	1.2	1.2	-0.1	-9.8
Intrusiveness During Parent-Child Semistructured Play	1.4	1.5	-0.1	-6.7	1.7	1.7	-0.0	-2.3	1.7	1.7	-0.1	-7.0
Detachment During Parent-Child Puzzle Challenge Task	1.6	1.6	-0.0	-3.0	1.7	1.7	-0.0	-2.4	1.6	1.7	-0.1	-4.9
Intrusiveness During Parent-Child Puzzle Challenge Task	2.5	2.5	0.0	0.0	2.9	3.1	-0.2*	-16.6	2.6	2.6	-0.0	-1.8
Negative Regard During Parent-Child Semistructured Play	1.3	1.3	0.0	2.4	1.3	1.3	-0.0	-3.5	1.3	1.3	-0.0	-0.4
HOME Harshness**	0.2	0.3	-0.1	-12.1	0.4	0.2	0.1**	20.6	0.3	0.3	-0.0	-1.0
Percentage of Parents Who Spanked Child in the Past Week***	44.0	52.2	-8.1*	-16.3	46.8	55.7	-8.9**	-17.9	49.6	56.7	-7.2	-14.4

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Table VI.6 (*Continued*)

	Early Implementers				Late Implementers				Incomplete Implementers			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]
Knowledge of Child Development, Discipline Strategies, and Safety Practices												
Percentage of Parents Who Usually Use a Car Seat Correctly***	73.3	73.9	-0.5	-1.2	72.3	74.8	-2.5	-5.4	62.3	68.8	-6.5	-14.2
Percentage of Parents Suggesting Physical Punishment as a Discipline Strategy***	31.5	42.0	-10.5***	-20.9	54.4	59.3	-4.9	-9.7	54.2	55.8	-1.6	-3.2
Percentage of Parents Who Would Use Mild Discipline Only***	58.8	49.5	9.3**	18.8	37.3	30.2	7.1*	14.4	36.8	37.9	-1.1	-2.3
Index of Severity of Discipline Strategies	2.9	3.3	-0.4***	-23.3	3.6	3.9	-0.2**	-14.7	3.6	3.6	-0.0	-1.2
Sample Size												
Parent Interview	388	358	746		418	362	780		301	283	584	
Parent-Child Interactions	306	291	597		348	295	643		220	198	418	

SOURCE: Parent interviews, child assessments, interviewer observations, and assessments of semistructured parent-child interactions conducted when children were approximately 36 months old.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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to children daily were positive and statistically significant among parents in early-implemented programs. Impacts on quality of assistance in the puzzle challenge task and support for language and learning were statistically significant among parents in later-implemented programs. Later-implemented programs also had a favorable impact on parents' regular reading to the child at bedtime. When children were 2 years old, Early Head Start impacts on parent stimulation of children's language and learning were concentrated among the early implementers.

Early Head Start programs that were implemented later had statistically significant impacts on several negative parenting behaviors. Parents in later-implemented programs were less likely to be detached during semistructured play and were less likely to be intrusive during the puzzle challenge task compared with their control-group counterparts. However, impacts on hostility and punishment were mixed for parents in later-implemented programs. Compared with control-group parents, Early Head Start parents were more harsh toward the child during the interview, as rated in the interviewer observation, although average levels of harshness were very low for both groups.[7] Early Head Start had no impact on negative regard toward the child during semistructured play (and average levels were low for both groups, as scores range from 1 to 7). Significantly fewer Early Head Start parents reported that they spanked the child in the previous week, and parents were more likely to suggest mild, less punitive discipline strategies in response to common parent-child conflict situations compared to their control-group counterparts. It is possible that the later-implemented programs increased knowledge about the adverse effects of punitive parenting practices without making significant changes in behavior.

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[7] As discussed in Chapter V, harshness measures whether the parent scolded the child, physically restrained the child, or slapped or spanked the child during the interview. Scores can range from 0, if no harsh behavior was observed, to 3, if all three types of behavior were observed.

Early-implemented programs had significant impacts on punishment and discipline strategies. Although Early Head Start programs in all three implementation groups tended to reduce the incidence of physical punishment, parents in early-implemented programs also were significantly more likely than their control-group counterparts to suggest using mild and non-punitive discipline strategies in response to common parent-child conflict situations. Parents in early-implemented programs were significantly less likely than their control-group counterparts to suggest using physical punishment as a discipline strategy.

In summary, both early- and later-implemented programs had favorable impacts across several domains of parenting. In particular, these programs increased emotional support of the child, increased support for child language and cognitive development, and reduced negative parenting behaviors. The impacts across several domains of parenting may partly explain the favorable impacts on children's cognitive and language development and certain behavioral outcomes among these programs. In addition, Early Head Start programs that were incompletely implemented had a favorable impact on supportive behavior during play and tended to reduce the incidence of physical punishment. These impacts on emotional support and physical punishment could partly explain the favorable impacts on children's behavioral outcomes among these programs.

3. Parent Mental Health and Self-Sufficiency

At the 3-year-old assessment point, some impacts on parent mental health emerged in the early-implemented and incompletely implemented programs (Table VI.7). Parents in Early Head Start programs that were not completely implemented reported significantly lower levels of parental distress compared with their control-group counterparts. Early-implemented Early Head Start programs significantly lowered average levels of depressive symptoms reported by parents,

TABLE VI.7

IMPACTS ON PARENT PHYSICAL AND MENTAL HEALTH AT THE 36-MONTH ASSESSMENT, BY PATTERN OF PROGRAM IMPLEMENTATION

	Early Implementers				Late Implementers				Incomplete Implementers			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]
Parent Physical and Mental Health												
Parent's Health Status	3.4	3.5	-0.1	-6.7	3.4	3.3	0.1	11.0	3.5	3.6	-0.1	-13.4
Parenting Stress Index (PSI) Parental Distress	24.3	25.0	-0.7	-7.7	25.9	26.3	-0.5	-5.0	23.8	25.5	-1.7*	-17.6
PSI Parent-Child Dysfunctional Interaction	18.0	17.6	0.4	6.9	17.8	17.9	-0.2	-2.8	17.4	17.8	-0.5	-7.3
Center for Epidemiological Studies Depression (CES-D; Short Form)	7.6	8.7	-1.1*	-15.5	7.5	7.4	0.1	1.6	7.0	7.1	-0.1	-1.4
CES-D Severe Depressive Symptoms ***[d]	14.9	17.3	-2.4	-6.7	14.5	13.8	0.7	2.1	13.9	13.8	0.1	0.3
Family Environment Scale (FES): Family Conflict	1.7	1.7	-0.0	-8.0	1.7	1.7	0.0	0.5	1.6	1.7	-0.1	-15.2
Sample Size												
Parent Interview	388	358	746		418	362	780		301	283	584	
Parent-Child Interactions	306	291	597		348	295	643		220	198	418	

SOURCE: Parent interviews, child assessments, interviewer observations, and assessments of semistructured parent-child interactions conducted when children were approximately 36 months old.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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consistent with the reduction in the probability of depression found among these programs when children were 2 years old.

Impacts on parents' self-sufficiency activities (employment, education, and training) tended to be greatest for parents in early-implemented and incompletely implemented programs (Table VI.8). Impacts on education or training activities were favorable for all three groups of programs classified by implementation status, but the impacts were significantly larger among parents in incompletely implemented programs. Although parents in incompletely implemented programs participated in vocational education programs at higher levels than they participated in high school programs, the incompletely implemented Early Head Start programs had greater impacts on high school attendance, nearly doubling participation. Impacts on quarterly rates of participation in education and training were favorable and significant for parents in incompletely implemented programs from the third through the eighth quarter after enrollment. Impacts on quarterly rates of participation in education and training activities tended to be favorable in the other two implementation groups, but did not reach statistical significance.

Impacts on employment were positive and significant for early-implemented programs, and the impact on the employment rate during the first two years after enrollment was positive among parents in incompletely implemented programs. Impacts on quarterly employment rates among parents in early-implemented programs were statistically significant in the fourth through sixth quarters after enrollment, but they were not significant in any quarter among parents in later- or incompletely implemented programs.

4. The Importance of Implementation

The impacts of Early Head Start on 3-year-old children and their parents suggest that fully implementing the performance standards is important. By the time children reached 3 years of age, however, early implementation of the performance standards appears to have been less

TABLE VI.8

IMPACTS ON SELF-SUFFICIENCY, BY PATTERN OF IMPLEMENTATION

Outcome	Early Implementers				Late Implementers				Incomplete Implementers			
	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]
Education/Job Training												
Ever in Education or Training***[d]	60.6	53.2	7.4*	14.8	56.4	51.2	5.1	10.3	63.5	52.0	11.5**	23.0
Ever in High School***	7.4	6.9	0.5	1.7	15.7	11.9	3.8*	13.2	18.5	9.4	9.1***	31.9
Ever in ESL Class***	2.9	3.2	-0.3	-2.4	4.4	3.0	1.3	9.3	3.1	2.2	1.0	6.8
Ever in Vocational Program***	20.5	17.2	3.3	8.7	16.3	17.3	-1.0	-2.7	23.1	18.0	5.1	13.7
Average Hours per Week in Education or Training	3.4	3.1	0.3	4.0	4.5	3.4	1.1**	17.9	6.1	4.2	1.9**	29.8
In Education or Training:												
1st Quarter***	23.6	19.3	4.4	10.6	21.8	23.0	-1.2	-3.0	21.2	26.0	-4.8	-11.7
2nd Quarter***	23.6	23.2	0.4	1.0	27.8	24.2	3.6	8.3	30.3	29.1	1.3	2.9
3rd Quarter***	25.9	23.8	2.1	4.7	30.6	27.3	3.2	7.3	39.0	31.2	7.8*	17.6
4th Quarter***	28.2	23.5	4.8	11.1	29.1	24.2	4.9	11.5	37.0	29.4	7.6*	17.7
5th Quarter***	27.1	25.1	2.1	4.8	29.0	25.8	3.3	7.6	36.5	27.9	8.6**	20.0
6th Quarter***	27.8	24.0	3.7	9.0	25.8	23.7	2.1	5.0	36.2	23.9	12.3***	29.6
7th Quarter***	22.5	22.5	-0.0	-0.1	24.7	22.9	1.8	4.5	32.6	17.8	14.8***	36.9
8th Quarter***	22.1	20.0	2.1	5.3	26.0	21.0	5.0	12.7	32.6	18.1	14.5***	37.1
Have High School Diploma ***	56.5	57.0	-0.5	-0.9	37.4	41.4	-4.0	-7.9	58.7	51.6	7.1	14.2
Have GED***	14.0	10.8	3.3	10.3	8.4	6.6	1.8	5.7	7.2	15.4	-8.2**	-25.9
Employment												
Ever Employed***	90.0	84.2	5.8**	15.4	82.3	82.9	-0.6	-1.5	88.0	82.2	5.7	15.3
Average Hours/Week Employed	18.6	17.0	1.6	10.9	15.9	16.9	-1.0	-6.8	16.9	16.8	0.1	0.5
Employed in:												
1st Quarter***	44.5	43.3	1.2	2.5	37.8	35.9	1.9	4.0	33.7	37.2	-3.5	-7.2
2nd Quarter***	53.0	49.8	3.2	6.4	42.8	44.3	-1.5	-3.0	39.8	42.5	-2.8	-5.5
3rd Quarter***	61.8	56.5	5.3	10.6	46.8	50.8	-4.0	-8.0	49.6	50.3	-0.7	-1.4
4th Quarter***	66.4	58.5	7.9**	15.9	50.5	50.7	-0.3	-0.5	52.9	55.1	-2.3	-4.6
5th Quarter***	68.9	59.6	9.3***	18.9	58.5	57.2	1.3	2.7	55.9	60.2	-4.4	-8.9
6th Quarter***	68.1	58.0	10.0**	20.3	59.2	57.3	1.9	3.8	64.7	61.4	3.3	6.7
7th Quarter***	61.4	57.2	4.2	8.4	60.4	57.6	2.8	5.7	59.5	54.9	4.6	9.2
8th Quarter***	66.7	60.1	6.6	13.5	61.3	59.9	1.4	2.8	61.7	64.1	-2.3	-4.8
Any Self-Sufficiency-Oriented Activity (Education, Training or Employment)												
Ever Employed or in Education/Training***	94.8	90.8	4.0*	13.1	91.3	89.9	1.3	4.4	96.1	90.2	5.9**	19.4
Average Hours per Week in Any Activity	22.3	20.8	1.5	9.6	21.2	20.7	0.5	3.2	23.8	21.4	2.4	15.3
In Activities in:												
1st Quarter***	57.8	53.5	4.4	8.8	51.8	50.3	1.5	3.1	49.4	53.9	-4.1	-8.1
2nd Quarter***	64.3	59.8	4.4	9.0	60.7	57.8	2.9	5.8	61.8	59.2	2.5	5.1
3rd Quarter***	72.1	69.2	2.9	6.2	64.7	64.3	0.4	0.9	74.9	65.6	9.2**	19.4
4th Quarter***	77.6	68.0	9.7***	20.2	66.4	63.8	2.6	5.4	73.6	66.0	7.5*	15.8
5th Quarter***	77.3	71.2	6.1*	13.2	71.5	68.2	3.3	7.2	74.8	68.9	5.9	12.7
6th Quarter***	77.9	68.9	9.0**	19.1	71.2	66.6	4.5	9.6	82.3	68.3	14.0***	29.8

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Table VI.8 (*Continued*)

	Early Implementers				Late Implementers				Incomplete Implementers			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]
7th Quarter***	71.1	67.9	3.2	6.8	69.4	65.7	3.7	7.7	76.2	62.3	13.8***	28.9
8th Quarter***	75.1	68.0	7.1*	15.3	70.6	68.2	2.4	5.2	77.4	70.2	7.2	15.4
AFDC/TANF Receipt												
Ever Received AFDC/TANF***	40.1	39.5	0.6	1.2	48.7	44.9	3.8	7.5	53.8	49.1	4.7	9.4
Received AFDC/TANF in:												
1st Quarter***	29.9	27.3	2.6	5.5	33.9	28.8	5.2*	11.1	38.8	36.9	1.9	3.9
2nd Quarter***	30.7	27.6	3.1	6.6	33.5	30.0	3.6	7.5	40.3	41.2	-0.9	-1.9
3rd Quarter***	31.6	28.9	2.7	5.7	35.0	33.7	1.3	2.7	45.5	42.2	3.3	6.9
4th Quarter***	24.4	24.1	0.3	0.5	29.3	28.4	0.9	1.9	40.1	37.2	2.9	6.3
5th Quarter***	21.7	25.4	-3.8	-8.2	30.6	26.5	4.1	9.0	38.8	35.9	2.9	6.4
6th Quarter***	20.2	25.8	-5.6*	-12.2	30.6	27.0	3.6	7.8	38.5	38.8	-0.3	-0.6
7th Quarter***	17.8	20.2	-2.4	-5.4	25.3	23.0	2.4	5.4	26.4	34.8	-8.4*	-19.2
8th Quarter***	16.0	19.5	-3.4	-8.1	24.9	21.5	3.4	7.9	26.5	29.7	-3.2	-7.5
Total AFDC/TANF Benefits ($)	1,992.0	2,151.8	-159.8	-4.1	2,115.9	1,958.4	157.6	4.1	2,391.1	2,416.2	-25.1	-0.7
Receipt of Other Welfare Benefits												
Ever Received Welfare***	66.4	64.3	2.1	4.5	70.0	67.6	2.3	5.0	68.8	65.7	3.2	6.7
Total Welfare Benefits ($)	5,208.0	5,486.1	-278.1	-3.7	5,309.6	5,627.5	-317.8	-4.2	5,375.8	5,651.6	-275.8	-3.7
Ever Received Food Stamps***	58.1	58.5	-0.4	-0.7	62.7	60.3	-2.4	4.9	62.3	58.8	3.5	7.2
Total Food Stamp Benefits ($)	2,064.7	2,154.3	-89.6	-3.3	1,987.4	1,867.5	119.9	4.4	2,376.9	2,302.5	74.4	2.7
Income/Poverty												
Income Above Poverty Level***	41.9	44.9	-3.0	-6.1	36.2	43.1	-6.8*	-13.9	52.3	40.3	11.9**	24.2
Subsequent Births												
Subsequent Birth by 24 Months after Random Assignment***	22.0	28.3	-6.4	-14.2	26.5	27.1	-0.6	-1.4	19.6	26.7	-7.1	-15.7
Sample Size	**266**	**367**	**733**		**410**	**374**	**784**		300	270	570	

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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important, as families in later-implemented programs received fully implemented services for a year or longer and experienced a stronger pattern of impacts than they did when the children were 2. It appears that some significant experience with a fully-implemented program may be sufficient to generate positive outcomes for children and families. It is also possible that other factors contributed to the pattern of impacts we have described here. Home-based programs were challenging to implement, and as a consequence, only one of the seven was implemented early. Thus, the pattern of impacts by program implementation could be partly attributable to differences in impacts by program approach. To explore the potential confounding of implementation pattern and approach to service delivery, we examined the patterns of impacts by program implementation separately within two of the program approach subgroups. Within the home-based and mixed-approach programs, it was possible to examine differences in impacts by implementation pattern while holding program approach constant.[8] The results provide evidence that fully implementing the performance standards makes a difference.

Home-based programs had fewer impacts overall, but the four early/later implementers had significant favorable impacts on children's cognitive and language development, parental distress, and reported spanking in the past week (Tables VI.9 and VI.10). The three incompletely implemented home-based programs had significant favorable impacts only on two aspects of children's social-emotional development (sustained attention and engagement of parent in the play task) and parents' participation in education and training activities. These

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[8] We were unable to examine differences in implementation within the center-based programs because the sample included only four center-based programs. The analysis of implementation within the home-based and mixed-approach programs required dividing programs differently by implementation pattern in order to form subgroups of sufficient size for the analysis. Thus, within home-based programs, we compared early and later-implemented programs with the incompletely implemented ones; within mixed programs, we compared early-implemented programs with those that were implemented either later or incompletely.

TABLE E.VI.9

IMPACTS ON CHILD AND FAMILY OUTCOMES AT AGE 3, BY IMPLEMENTATION STATUS FOR HOME-BASED PROGRAMS

	Early or Late Implementers					Incomplete Implementers			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]		Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]
Child Cognitive and Language Development									
Bayley Mental Development Index (MDI) Standard Score*[d]	92.9	90.2	2.7**	21.0		95.5	96.2	-0.7	-5.3
Percentage with MDI < 85***	24.9	27.3	-2.4	-5.2		14.8	14.7	0.1	0.1
Peabody Picture Vocabulary Test (PPVT-III) Standard Score*	81.4	77.2	4.2*	25.6		87.6	88.8	-1.1	-6.8
Percentage with PPVT-III < 85***	55.9	60.1	-4.2	-8.3		35.6	38.3	-2.6	-5.3
Child Social-Emotional Development									
Engagement of Parent During Parent-Child Semistructured Play	4.7	4.7	0.1	9.4		5.0	4.6	0.4**	33.6
Sustained Attention with Objects During Parent-Child Semistructured Play	4.9	4.8	0.0	3.5		5.1	4.9	0.2*	23.6
Engagement of Parent During Parent-Child Puzzle Challenge Task	5.1	5.1	0.0	0.3		5.1	5.0	0.1	12.0
Persistence During Parent-Child Puzzle Challenge Task	4.7	4.6	0.0	2.4		4.8	4.5	0.3	22.3
Bayley Behavioral Rating Scale (BRS): Emotional Regulation	4.0	3.9	0.1	12.3		3.9	4.0	-0.1	-15.1
Bayley BRS: Orientation/ Engagement	3.8	3.7	0.1	10.0		3.9	3.9	-0.1	-6.9
Negativity Toward Parent During Parent-Child Semistructured Play	1.3	1.3	-0.0	-0.8		1.3	1.4	-0.1	-11.6
Frustration During Parent-Child Puzzle Challenge Task	2.7	2.6	0.1	7.9		2.7	2.8	-0.0	-1.2
Child Behavior Checklist—Aggressive Behavior	11.6	12.0	-0.4	-6.8		10.7	11.6	-0.9	-13.7
Child Health Status									
Child's Health Status	3.9	3.9	0.0	0.5		4.1	4.1	-0.1	-4.9
Percentage of Children in Fair or Poor Health***	12.7	12.4	0.2	0.8		6.1	6.7	-0.5	-1.9
Quality of the Home Environment and Parenting: Overall and Physical Environment									
Home Observation for Measurement of the Environment (HOME) Total Score	28.1	27.9	0.2	4.4		28.4	28.3	0.2	3.7
HOME Internal Physical Environment	7.9	8.0	-0.1	-4.8		8.1	8.0	0.1	4.8
Parenting Behavior: Emotional Support									
HOME Warmth	2.7	2.7	0.0	4.2		2.7	2.8	-0.1	-5.6
Supportiveness During Parent-Child Semistructured Play	4.0	3.9	0.1	6.7		4.1	3.9	0.2	21.6
Supportive Presence During Parent-Child Puzzle Challenge Task	4.6	4.6	0.0	1.5		4.5	4.4	0.1	6.3
Parenting Behavior: Stimulation of Language and Learning									
Percentage of Children with a Regular Bedtime***	58.2	55.3	2.8	5.8		61.7	53.9	7.8	15.9

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TABLE E.VI.9 (*continued*)

	Early or Late Implementers				Incomplete Implementers			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]
Percentage of Children Who Follow a Bedtime Routine***	70.5	70.0	0.6	1.2	74.9	68.3	6.6	14.2
HOME: Support of Language and Learning	10.7	10.5	0.3	11.9	11.1	11.0	0.1	4.5
Parent-Child Play	4.3	4.3	-0.0	-3.4	4.5	4.5	0.1	-7.2
Quality of Assistance During Parent-Child Puzzle Challenge Task	3.7	3.5	0.2	12.8	3.4	3.6	-0.2	-16.3
Percentage of Parents Who Read to Child Daily***	51.8	53.1	-1.4	-2.8	57.9	59.6	-1.7	-3.3
Percentage of Parents Who Read to Child at Bedtime***	28.9	25.4	3.5	7.7	30.8	27.0	3.7	8.2
Parenting Behavior: Negative Parenting Behavior								
Detachment During Parent-Child Semistructured Play	1.2	1.2	0.0	1.1	1.2	1.3	-0.1	-9.3
Intrusiveness During Parent-Child Semistructured Play	1.6	1.5	0.0	4.5	1.6	1.7	-0.1	-11.3
Detachment During Parent-Child Puzzle Challenge Task	1.5	1.5	0.0	1.1	1.7	1.7	0.0	0.3
Intrusiveness During Parent-Child Puzzle Challenge Task	2.6	2.7	-0.1	-8.2	2.4	2.4	-0.0	-1.6
Negative Regard During Parent-Child Semistructured Play	1.2	1.2	-0.1	-10.3	1.3	1.3	-0.0	-5.4
HOME Harshness	0.3	0.2	0.1	10.8	0.4	0.4	-0.0	-7.0
Percentage of Parents Who Spanked Child in the Past Week***	36.2	45.9	-9.7**	-19.5	54.9	61.8	-1.9	-3.9
Knowledge of Safety Practices and Discipline Strategies								
Percentage of Parents Who Usually Use a Car Seat Correctly***	75.2	75.1	0.1	0.2	64.1	61.8	2.3	5.1
Percentage of Parents Suggesting Physical Punishment as a Discipline Strategy***	32.1	33.4	-1.3	-2.6	62.6	60.4	2.2	4.3
Percentage of Parents Who Would Use Mild Discipline Only***	55.8	53.7	2.1	4.2	31.4	34.8	-3.4	-6.9
Index of Severity of Discipline Strategies	2.9	3.0	-0.1	-6.3	3.9	3.8	0.1	3.5
Parent Physical and Mental Health								
Parent's Health Status	3.3	3.3	0.0	3.3	3.4	3.6	-0.2	-14.8
Parenting Stress Index (PSI) Parental Distress	25.8	27.7	-1.9**	-20.2	23.6	25.1	-1.5	-15.7
PSI Parent-Child Dysfunctional Interaction	17.7	18.1	-0.4	-6.7	17.2	18.0	-0.8	-12.9
Center for Epidemiological Studies Depression (CES-D; Short Form)	7.7	8.2	-0.5	-7.3	7.8	7.4	0.4	5.0
CES-D Severe Depressive Symptoms ***	15.0	17.5	-2.5	-7.0	13.6	14.6	-1.0	-2.8
Family Environment Scale (FES): Family Conflict	1.8	1.7	0.1	8.6	1.6	1.7	-0.1	-17.0
Sample Size								
Bayley	**303**	**259**	**562**		**199**	**189**	**388**	
Parent Interview	**261**	**225**	**486**		**135**	**123**	**258**	
Parent-Child Interactions	**246**	**213**	**459**		**150**	**137**	**287**	

SOURCE: Parent interviews, child assessments, interviewer observations, and assessment of semistructured parent-child interactions conducted when children were approximately 36 months old.

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TABLE E.VI.9 (*continued*)

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included-in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE E.VI.10

IMPACTS ON SELF-SUFFICIENCY AT 28 MONTHS, BY IMPLEMENTATION STATUS FOR HOME-BASED PROGRAMS

	Early or Late Implementers				Incomplete Implementers			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]
Education/Job Training								
Ever in Education or Training***[d]	46.5	46.3	0.2	0.4	63.2	41.6	21.6***	43.2
Ever in High School***	11.1	6.9	4.1*	14.5	14.5	5.3	9.2***	32.3
Ever in ESL Class***	5.7	4.2	1.5	10.6	0.4	-0.1	0.5	3.5
Ever in Vocational Program***	13.1	16.4	-3.3	-8.8	25.8	13.6	12.2**	32.3
Average Hours per Week in Education or Training	3.0	2.6	0.5	7.6	6.6	3.0	3.7***	57.8
In Education or Training:								
1st Quarter***	18.4	19.3	-0.9	-2.2	25.2	22.0	3.2	7.7
2nd Quarter***	21.7	19.0	2.7	6.3	29.9	25.5	4.4	10.3
3rd Quarter***	21.8	23.5	-1.8	-4.0	37.5	28.0	9.5**	21.6
4th Quarter***	23.4	19.9	3.5	8.1	32.7	23.4	9.3**	21.7
5th Quarter***	23.9	21.7	2.1	5.0	35.6	22.7	12.9***	30.0
6th Quarter***	21.5	22.7	-1.2	-2.8	38.6	18.7	19.9***	47.9
7th Quarter***	19.2	19.3	-0.1	-0.3	28.6	13.6	15.0***	37.3
8th Quarter***	20.9	15.9	4.9	12.5	29.4	15.7	13.7***	34.8
Have High School Diploma***	39.1	40.2	-1.2	-2.3	62.4	53.3	9.1*	18.2
Have GED***	7.9	6.1	1.9	5.9	9.6	19.2	-9.6**	-30.2
Employment								
Ever Employed***	79.0	80.3	-1.3	-3.6	89.5	83.1	6.4	17.0
Average Hours/Week Employed	13.9	14.3	-0.4	-2.6	16.2	15.9	0.4	2.6
Employed in:								
1st Quarter***	34.1	33.6	0.5	1.0	33.6	38.2	-4.6	-9.5
2nd Quarter***	37.1	41.3	-4.1	-8.3	39.4	43.6	-4.2	-8.3
3rd Quarter***	43.7	48.1	-4.4	-8.8	51.1	52.3	-1.2	-2.5
4th Quarter***	48.7	48.9	-0.2	-0.3	56.4	53.5	2.9	5.7
5th Quarter***	55.6	56.7	-1.1	-2.2	61.1	59.8	1.3	2.7
6th Quarter***	57.7	54.1	3.5	7.2	67.6	63.0	4.6	9.3
7th Quarter***	57.1	56.7	0.4	0.9	58.6	52.6	6.1	12.3
8th Quarter***	55.1	58.3	-3.2	-6.5	57.6	62.0	-4.4	-8.9
Any Self-Sufficiency-Oriented Activity (Education, Training, or Employment)								
Ever Employed or in Education/Training***	87.1	87.6	-0.5	-1.6	96.4	88.4	7.9***	26.2
Average Hours per Week in Any Activity	17.5	17.0	0.4	2.8	23.5	19.6	3.9**	24.5
In Activities in:								
1st Quarter***	44.4	44.9	-0.6	-1.1	51.3	50.5	0.8	1.6
2nd Quarter***	48.5	51.9	-3.4	-6.8	60.1	57.3	2.8	5.7
3rd Quarter***	53.9	59.0	-5.0	-10.6	74.0	65.6	8.3*	17.6
4th Quarter***	60.0	57.6	2.4	5.1	72.7	63.0	9.6**	20.2
5th Quarter***	65.2	65.2	-0.0	-0.1	76.1	69.3	6.8	14.6
6th Quarter***	65.9	63.4	2.5	5.2	82.8	68.8	13.9***	29.7
7th Quarter***	64.0	53.6	0.4	0.9	70.4	60.8	9.6*	20.1
8th Quarter***	62.6	64.1	-1.6	-3.3	69.7	68.9	0.8	1.8

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TABLE E.VI.10 (*continued*)

	Early or Late Implementers				Incomplete Implementers			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]
AFDC/TANF Receipt								
Ever Received AFDC/TANF***	44.8	42.1	2.7	5.4	69.7	65.7	4.0	8.0
Received AFDC/TANF in:								
1st Quarter***	34.6	31.0	3.6	7.8	52.8	49.7	3.1	6.5
2nd Quarter***	33.6	32.0	1.6	3.4	53.4	55.5	-2.1	-4.4
3rd Quarter***	35.4	34.3	1.2	2.4	61.1	55.5	5.6	11.7
4th Quarter***	28.8	30.1	-1.1	-2.7	48.9	48.6	0.2	0.5
5th Quarter***	28.0	29.1	-1.1	-2.4	47.0	49.1	-2.2	-4.7
6th Quarter***	29.6	28.0	1.6	3.4	46.4	51.6	-5.2	-11.3
7th Quarter***	23.7	21.2	2.4	5.6	33.3	44.0	-10.7**	-24.3
8th Quarter***	24.0	18.3	5.7*	13.5	33.7	38.5	-4.9	-11.5
Total AFDC/TANF Benefits ($)	$2,394.0	$2,535.0	-$141.0	-3.7	$3,108.0	$3,172.0	-$64.0	-1.7
Receipt of Other Welfare Benefits								
Ever Received Welfare***	63.9	62.7	1.2	2.6	85.2	79.6	5.6*	11.9
Total Welfare Benefits ($)	$5,186.0	$5,559.0	-$373.0	-4.9	$6,886.0	$6,785.0	$101.0	1.3
Ever Received Food Stamps***	57.8	58.5	-0.7	-1.5	78.4	74.8	3.7	7.5
Total Food Stamp Benefits ($)	$1,753.0	$1,660.0	$93.0	3.4	$3,024.0	$2,758.0	$265.0	9.7
Income/Poverty								
Income Above Poverty Level***	42.8	44.9	-2.2	-4.4	38.8	37.9	0.9	1.8
Subsequent Births								
Subsequent Birth by 24 Months after Random Assignment***	26.5	26.2	0.3	0.6	25.9	31.3	-5.4	-12.0
Sample Size	**287**	**276**	**563**		**201**	**177**	**378**	

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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impacts may reflect the strong family support components of some of the incompletely implemented programs that encountered challenges in implementing the Early Head Start child development requirements.

We also examined impacts within the mixed-approach programs. Six programs could be divided into three that were fully implemented early and three that were implemented later or incompletely. Early Head Start mixed-approach programs that were implemented early had stronger impacts than incompletely implemented programs across a broad range of outcomes, with effect sizes in the 20 to 50 percent range. These early-implemented mixed-approach programs had stronger impacts on children's cognitive and social-emotional development than late or incompletely implemented programs (Table VI.11). Although the impact of the early-implemented programs on the average PPVT-III score appears to be smaller than that of the later and incompletely implemented programs, the early implementers significantly reduced the proportion of children scoring below 85, while the later and incompletely implemented programs did not.

With the exception of parental detachment during play, impacts on parenting tended to be stronger for the early-implemented programs, including the impacts on supportive presence in the puzzle challenge task and the percentage of parents reading daily and at bedtime to their children. Impacts on parents' mental health, including symptoms of depression and dysfunctional interaction, tended to be more favorable among early implementers. The only significant impact was an increase in dysfunctional interaction among the late/incomplete implementers. Both groups of programs increased parents' participation in education programs and in employment activities, although the employment impacts tended to be larger and were statistically significant for parents in the early-implemented programs (Table VI.12).

TABLE E.VI.11

IMPACTS ON CHILD AND FAMILY OUTCOMES AT AGE 3, BY IMPLEMENTATION STATUS OF MIXED APPROACH PROGRAMS

	Early Implementation				Late or Incomplete Implementation			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]
Child Cognitive and Language Development								
Bayley Mental Development Index (MDI) Standard Score*[d]	93.1	89.5	3.7*	28.3	85.4	86.4	-1.0	-7.7
Percentage with MDI < 85***	27.2	36.4	-9.2	-19.7	45.3	43.6	1.7	3.6
Peabody Picture Vocabulary Test (PPVT)-III Standard Score	85.8	83.4	2.4	14.9	78.3	73.4	4.9	29.8
Percentage with PPVT-III < 85***	45.7	62.6	-16.9**	-33.9	66.2	70.2	-4.0	-8.1
Child Social-Emotional Development								
Engagement of Parent During Parent-Child Semistructured Play	4.9	4.5	0.5***	43.4	4.6	4.4	0.2	19.9
Sustained Attention with Objects During Parent-Child Semistructured Play	5.1	4.7	0.4***	41.7	4.8	4.7	0.2	16.8
Engagement of Parent During Parent-Child Puzzle Challenge Task	5.0	4.9	0.0	3.4	5.0	4.9	0.1	11.5
Persistence During Parent-Child Puzzle Challenge Task	4.6	4.5	0.1	11.6	4.4	4.4	-0.0	-2.0
Bayley Behavioral Rating Scale (BRS): Emotional Regulation	4.0	4.1	-0.1	-15.2	4.0	4.1	-0.1	-15.2
Bayley BRS: Orientation/ Engagement	3.9	4.0	-0.2	-19.7	3.8	4.0	-0.1	-15.7
Negativity Toward Parent During Parent-Child Semistructured Play	1.2	1.4	-0.1	-21.1	1.3	1.3	0.0	2.2
Frustration During Parent-Child Puzzle Challenge Task	2.9	2.9	-0.0	-1.4	2.8	2.5	0.2	17.6
Child Behavior Checklist—Aggressive Behavior	11.0	12.0	-1.0	-14.8	10.3	10.3	-0.1	-0.8
Child Health Status								
Child's Health Status	4.1	4.2	-0.1	-14.2	4.2	4.0	0.2	17.1
Percentage of Children in Fair or Poor Health***	6.3	4.8	1.5	5.4	4.5	7.4	-2.9	-10.2
Quality of the Home Environment and Parenting: Overall and Physical Environment								
Home Observation for Measurement of the Environment (HOME) Total Score	27.8	27.1	0.6	12.8	26.3	26.0	0.3	5.8
HOME Internal Physical Environment	7.7	7.7	0.0	0.7	7.8	7.9	-0.1	-5.6
Parenting Behavior: Emotional Support								
HOME Warmth	2.5	2.3	0.1	13.8	2.4	2.4	0.0	0.7
Supportiveness During Parent-Child Semistructured Play	4.1	3.8	0.3	27.1	3.8	3.6	0.2	18.4
Supportive Presence During Parent-Child Puzzle Challenge Task**	4.8	4.3	0.6***	42.2	4.0	4.0	-0.1	-3.6
Parenting Behavior: Stimulation of Language and Learning								
Percentage of Children with a Regular Bedtime***	58.5	66.1	-7.6	-15.4	59.9	62.0	-2.1	-4.2
Percentage of Children Who Follow a Bedtime Routine***	66.5	62.6	3.9	8.5	69.8	73.2	-3.3	-7.2

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TABLE E.VI.11 (*continued*)

	Early Implementation				Late or Incomplete Implementation			
Outcome	Program Group Participants	Control Group^a	Impact Estimate Per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate Per Participant^b	Effect Size^c
HOME: Support of Language and Learning	10.5	10.3	0.2	8.8	10.1	9.8	0.3	13.9
Parent-Child Play	4.3	4.1	0.2*	24.3	4.5	4.3	0.1	14.8
Quality of Assistance During Parent-Child Puzzle Challenge Task	3.9	3.6	0.3*	27.8	3.3	3.0	0.3*	25.1
Percentage of Parents Who Read to Child Daily***	60.4	37.3	23.1***	46.2	58.0	50.4	7.6	15.2
Percentage of Parents Who Read to Child at Bedtime***	39.0	27.4	11.6	25.5	35.2	32.0	3.2	7.1
Parenting Behavior: Negative Parenting Behavior								
Detachment During Parent-Child Semistructured Play	1.3	1.4	-0.1	-22.1	1.1	1.4	-0.2**	-35.7
Intrusiveness During Parent-Child Semistructured Play	1.5	1.6	-0.1	-7.8	1.8	1.7	0.1	7.0
Detachment During Parent-Child Puzzle Challenge Task	1.6	2.0	-0.4**	-37.2	1.8	2.0	-0.2	-18.8
Intrusiveness During Parent-Child Puzzle Challenge Task*	2.6	2.9	-0.4*	-27.4	2.9	2.8	0.2	13.5
Negative Regard During Parent-Child Semistructured Play	1.4	1.3	0.0	5.6	1.3	1.3	0.1	10.4
HOME Harshness	0.2	0.2	-0.0	-3.2	0.3	0.2	0.1	13.7
Percentage of Parents Who Spanked Child in the Past Week***	42.3	55.5	-13.2*	-26.5	50.7	61.8	-11.1*	-22.2
Knowledge of Safety Practices and Discipline Strategies								
Percentage of Parents Who Usually Use a Car Seat Correctly***	73.8	68.9	4.9	10.8	73.4	77.0	-3.6	-7.9
Percentage of Parents Suggesting Physical Punishment as a Discipline Strategy***	33.0	51.9	-18.9***	-37.8	54.9	58.3	-3.4	-6.8
Percentage of Parents Who Would Use Mild Discipline Only***	60.0	38.9	21.1***	42.8	38.5	35.0	3.5	7.2
Index of Severity of Discipline Strategies**	2.8	3.5	-0.7***	-43.8	3.6	3.7	-0.1	-7.8
Parent Physical and Mental Health								
Parent's Health Status	3.3	3.4	-0.1	-12.9	3.7	3.6	0.1	8.7
Parenting Stress Index (PSI) Parental Distress	24.2	25.3	-1.1	-11.6	25.4	25.7	-0.4	-3.8
PSI Parent-Child Dysfunctional Interaction	17.6	17.9	-0.4	-5.4	18.6	17.0	1.6*	25.2
Center for Epidemiological Studies Depression (CES-D; Short Form)*	7.2	8.5	-1.3	-18.1	7.1	6.1	1.0	14.3
CES-D Severe Depressive Symptoms ***	15.3	14.9	0.4	1.1	13.0	10.6	2.3	6.5
Family Environment Scale (FES): Family Conflict	1.7	1.8	-0.0	-6.7	1.6	1.6	-0.0	-2.4
Sample Size								
Bayley	**136**	**153**	**289**		**130**	**104**	**234**	
Parent Interview	**173**	**182**	**355**		**178**	**162**	**340**	
Parent-Child Interactions	**122**	**139**	**261**		**129**	**116**	**245**	

SOURCE: Parent interviews, child assessments, interviewer observations, and assessments of semistructured parent-child interactions conducted when children were approximately 36 months old.

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TABLE E.VI.11 *(continued)*

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE E.VI.12

IMPACTS ON SELF-SUFFICIENCY AT 28 MONTHS, BY IMPLEMENTATION STATUS OF MIXED APPROACH PROGRAMS

	Early Implementers				Late or Incomplete Implementers			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]
Education/Job Training								
Ever in Education or Training***[d]	60.7	44.1	16.6**	33.2	70.1	57.6	12.5**	25.0
Ever in High School***	7.2	6.8	0.4	1.4	23.9	14.1	9.7**	34.1
Ever in ESL Class***	3.0	2.8	0.2	1.4	7.1	4.2	2.9	20.3
Ever in Vocational Program***	22.2	15.4	6.8	18.0	22.8	19.4	3.3	8.9
Average Hours per Week in Education or Training	2.6	2.6	0.0	0.6	5.9	4.2	1.8**	27.5
In Education or Training:								
1st Quarter***	17.7	12.3	5.3	12.9	27.2	26.7	0.4	1.1
2nd Quarter***	17.2	14.3	2.9	6.6	37.3	29.2	8.1	18.7
3rd Quarter***	21.9	19.7	2.2	5.1	40.8	31.1	9.7*	22.0
4th Quarter***	24.7	21.9	2.8	6.5	38.3	30.0	8.2	19.2
5th Quarter***	22.6	23.2	-0.6	-1.3	36.8	33.3	3.5	8.1
6th Quarter***	25.8	22.1	3.7	8.8	29.0	27.3	1.7	4.1
7th Quarter***	21.9	21.2	0.7	1.8	31.3	24.5	6.8	17.0
8th Quarter***	22.4	14.3	8.1	20.7	33.0	24.5	8.5	21.7
Have High School Diploma ***	52.1	50.8	1.3	2.7	48.5	45.0	3.5	7.0
Have GED***	14.7	7.4	7.3	23.1	5.7	9.1	-3.4	-10.7
Employment								
Ever Employed***	88.5	78.2	10.3**	27.5	88.4	82.8	5.6	14.9
Average Hours/Week Employed	15.7	12.9	2.8	18.9	17.8	18.8	-1.0	-6.4
Employed in:								
1st Quarter***	31.7	32.1	-0.3	-0.7	38.8	34.2	4.7	9.6
2nd Quarter***	43.1	35.5	7.6	15.3	47.5	44.8	2.7	5.5
3rd Quarter***	52.5	46.2	6.2	12.4	53.1	56.0	-2.9	-5.8
4th Quarter***	58.6	47.4	11.2*	22.4	54.2	58.2	-4.0	-8.1
5th Quarter***	61.2	46.7	14.6**	29.6	59.4	61.0	-1.7	-3.4
6th Quarter***	60.2	49.5	10.7	21.7	64.4	61.2	3.4	6.8
7th Quarter***	55.5	48.5	7.0	14.1	66.9	57.0	9.9	20.0
8th Quarter***	63.9	50.2	13.8**	28.2	70.3	62.1	8.3	16.9
Any Self-Sufficiency-Oriented Activity (Education, Training, or Employment)								
Ever Employed or in Education/Training***	93.4	86.4	7.0*	23.1	97.7	91.4	6.3**	20.8
Average Hours per Week in Any Activity	18.7	16.1	2.6	16.6	23.9	23.0	0.9	5.9
In Activities in:								
1st Quarter***	44.1	40.7	3.4	6.8	57.6	52.8	4.8	9.7
2nd Quarter***	53.4	43.6	9.9*	20.0	70.2	60.9	9.4*	19.0
3rd Quarter***	63.3	59.1	4.2	8.8	78.0	68.3	9.7*	20.4
4th Quarter***	70.5	59.0	11.5**	24.2	73.1	72.0	1.2	2.4
5th Quarter***	69.5	60.8	8.7	18.9	78.1	72.8	5.3	11.5
6th Quarter***	70.3	61.8	8.5	18.1	78.1	70.1	8.0	17.0
7th Quarter***	64.8	59.6	5.2	10.9	78.5	66.7	11.8**	24.6
8th Quarter***	72.2	57.6	14.6**	31.3	82.1	69.6	12.4**	26.6

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TABLE E.VI.12 *(continued)*

	Early Implementers				Late or Incomplete Implementers			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]
AFDC/TANF Receipt								
Ever Received AFDC/TANF***	54.9	60.3	-5.4	-10.8	38.9	29.8	9.0**	18.2
Received AFDC/TANF in:								
1st Quarter***	42.7	39.7	3.0	6.3	23.3	19.6	3.7	8.0
2nd Quarter***	44.1	42.5	1.6	3.4	25.3	21.3	4.0	8.4
3rd Quarter***	47.4	43.1	4.3	9.0	26.5	23.9	2.6	5.4
4th Quarter***	40.4	38.6	1.8	3.9	20.9	13.9	6.9*	15.0
5th Quarter***	36.2	42.0	-5.8	-12.6	24.4	11.0	13.4***	29.2
6th Quarter***	34.6	41.3	-6.7	-14.5	18.5	12.2	6.3	13.6
7th Quarter***	29.9	33.1	-3.2	-7.2	15.5	12.3	3.3	7.4
8th Quarter***	25.7	33.4	-7.7	-18.0	13.7	14.1	-0.4	-0.9
Total AFDC/TANF Benefits ($)	$3,590	$3,592	-$2	-0.1	$1,046	$688	$358*	9.3
Receipt of Other Welfare Benefits								
Ever Received Welfare***	72.3	76.3	-3.9	-8.4	59.7	53.5	6.2	13.3
Total Welfare Benefits ($)	$7,084	$8,275	-$1,191	-15.7	$3,762	$3,834	-$77	-1.0
Ever Received Food Stamps***	64.0	71.5	-7.5	-15.3	52.6	43.6	9.0**	18.4
Total Food Stamp Benefits ($)	$2,560	$2,653	-$92	-3.4	$1,772	$1,558	$214	7.9
Income/Poverty								
Income Above Poverty Level***	36.3	34.4	1.9	3.9	47.1	50.0	-2.9	-6.0
Subsequent Births								
Subsequent Birth by 24 Months after Random Assignment***	20.0	27.9	-8.0	-17.7	28.6	28.4	0.2	0.4
Sample Size	**180**	**195**	**375**		**178**	**159**	**367**	

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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C. SUMMARY AND CONCLUSIONS

Two program features appear to be important for understanding the impacts of Early Head Start on the services families receive and on the ways in which programs influence children's development, parenting behavior, parents' mental health, and self-sufficiency. These features—the program's approach to serving families and its pattern of implementing key performance standards—were associated with differences in impacts on the receipt of services and on child and family outcomes.

When children were 3 years old, we found that favorable impacts on children's development, parenting behavior, and self-sufficiency appeared to be more numerous and stronger for mixed-approach programs, but center-based programs also had favorable impacts on a range of child development and parenting outcomes. At the same time, the findings were not completely favorable for parents in center-based programs, as some of those parents experienced symptoms of more-severe depression than their control-group counterparts. Home-based programs had few significant impacts.

These variations could be attributable in part to different durations of program participation. Families continued to participate in mixed-approach programs for a longer period, on average, than was true for families in center-based or home-based programs. Differences in length of participation, which may be attributable to the mixed-approach programs' greater flexibility in providing services as family needs changed, could have enabled families to make stronger and more sustained progress.

When programs are grouped by pattern of implementation, we found that while all three categories of programs had some important impacts at the 3-year assessment point, the early and later implementers favorably influenced a broader range of outcomes. By the time children were 3 years old, the later-implemented programs appear to have "caught up" with the early implementers in terms of their impacts on a broad range of important child development and parenting outcomes. This pattern suggests that a year or more of experience in a fully-implemented program, even when it occurs later in the families' enrollment period, provides benefits in terms of child and family outcomes.

Early-implemented programs had some impacts that were not found in the other groups. In addition to impacts on children's development and parenting, early-implemented programs had favorable impacts on parents' self-reported symptoms of depression, participation in education activities, and employment, areas that can take time for programs to influence and which later-implemented programs did not change. The findings suggest that early-implemented programs were able to move beyond influencing just child development and parenting support to also have an impact on family development, including self-sufficiency and mental health.

Our findings also suggest that fully implementing some, but not all, key services can make a difference for families and children. Incomplete implementers had favorable impacts on mental health (parental distress) and on participation in education and training programs. Many of these programs had strong family support components but did not meet some key performance standards for child development services. Thus, the fact that the incomplete implementers had an impact on mental health and self-sufficiency that was similar to those of the early implementers is consistent with what we know about features of the programs. Incomplete implementers had little impact on parenting behavior, although supportiveness in play was enhanced. Incomplete implementers reduced aggressive behavior and improved several aspects of child behavior in relation to the parent. Thus, the impacts on parents and children tended to be in the social-emotional, rather than the cognitive domains, which could reflect the programs' greater focus on family support relative to child development. In contrast, the early-implemented programs had significant impacts on a broad range of outcomes, including child cognitive, language and social-emotional development; parenting behavior; parent mental health and self-sufficiency.

While it is not possible to fully disentangle the effects of program approach and program implementation, analyses of impacts by pattern of implementation within the home-based and mixed-approach programs provide additional evidence that reaching full implementation contributes to a stronger pattern of impacts. Home-based programs that were fully implemented early or later had some favorable impacts on child cognitive and language development, impacts that are not often found in home-based program evaluations. Mixed-approach programs that were fully implemented early produced a stronger pattern of impacts (and some of the largest impacts detected in the study) compared with those that were not fully implemented early.

VII. DIFFERENTIAL EFFECTS OF EARLY HEAD START PROGRAMS ON CHILDREN AND FAMILIES WITH DIFFERENT CHARACTERISTICS

Beyond examining impacts overall and in key subgroups of programs, it is important to look at variations in impacts among key subgroups of families. For whom did Early Head Start make a significant difference in outcomes? And how did the impacts differ among families? Variations in impacts might provide insights into how the programs influenced children and families and could identify demographic groups that merit special attention in future training and technical assistance.

In this chapter, we present impacts for selected key subgroups. Key tables are at the end of the chapter (p. 358). Additional subgroup analyses are presented in Appendix E tables. The subgroups we focus on here include subgroups based on whether the family enrolled before the child was born, age of mother at child's birth, whether the child was the firstborn child, race/ethnicity, number of maternal risk factors, and for a subset of sites, whether the mother was at risk of depression when the family enrolled. In Appendix E, we present additional tables showing impacts for subgroups defined by other family characteristics, including the child's gender and the primary caregiver's living arrangements/marital status, receipt of welfare cash assistance, primary occupation (employment and school status), and highest grade completed at the time of enrollment. The subgroups highlighted in this chapter were selected because the patterns of impacts in these subgroups have the greatest implications for program practices.[1]

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[1] We examined the programs' impacts on 27 subgroups, which were defined based on family characteristics at the time of random assignment. The subgroups were defined based on one characteristic at a time, and these subgroupings naturally overlap. In sensitivity analyses we found that the patterns of differential impacts largely remained after potential confounding characteristics were controlled.

Our analyses of variations in impacts among family subgroups show that the Early Head Start research programs had significant impacts on some outcomes in almost every subgroup of families we studied, although the extent and pattern of impacts varied:

- ***The Early Head Start programs reached all types of families with child development services.*** They had significant positive impacts on service receipt in all subgroups of families we examined.

- ***By age 3, most groups of children benefited in some way from participating in Early Head Start.*** The programs had significant favorable impacts on at least one child development outcome for African American and Hispanic children, children who were enrolled prenatally and those enrolled after birth, firstborn and later-born children, children whose mothers lived with an adult other than their spouse, children of teenage and older mothers, children in families that were receiving TANF cash assistance and children in families that were not, children in all groups of families by primary occupation and highest grade completed, and children in families with fewer risk factors. A few groups of children did not benefit significantly, including children in white non-Hispanic families, children who lived alone with their mothers, children living with two parents, and children in the highest-risk families who enrolled (for whom the programs had significant negative impacts on some outcomes).

- ***Most parents benefited from participating in Early Head Start in some way related to their role as parents.*** Primary caregivers in all subgroups that we examined except one (those who were not receiving welfare cash assistance when they enrolled) experienced significant impacts on at least one aspect of parenting and family functioning by the time their child was 3 years old. Most subgroups experienced significant impacts on more than one aspect of parenting.

- ***Early Head Start also helped parents in most subgroups work toward economic self-sufficiency.*** The programs had positive impacts on participation in education and job training activities in all of the subgroups except families that enrolled with later-born children, two-parent families, and lower-risk families. The programs also had positive impacts on employment in some of the subgroups of parents, including those who were not teenagers when their child was born, parents of firstborn children, non-Hispanic African Americans, mothers who were not receiving welfare cash assistance when they enrolled, parents who were neither in school nor employed when they enrolled, and parents who had completed high school.

- ***The programs significantly delayed subsequent births in several subgroups.*** Although delaying subsequent births was not a goal of Early Head Start, programs worked with families toward their goals, which may have included delaying subsequent births, and made referrals to health care and family planning providers. Program participation led to significant delays in subsequent births among Hispanic and non-Hispanic, white families; families who enrolled with firstborn children; mothers who lived alone with their children; mothers who were receiving welfare cash assistance when they enrolled; mothers who were in school or neither employed nor in school; mothers who had not yet completed high school; and the highest-risk families.

Below, we highlight important variations in program impacts among key family subgroups. Because of the large number of subgroups and outcomes, we focus primarily on patterns of impacts. In the next section we present the hypotheses that guided our choice of subgroups and expected differences in impacts, describe our approach to estimating and interpreting subgroup impacts, and highlight variations in impacts across key subgroups. In the following section we highlight the estimated program impacts for several key policy-relevant subgroups and discuss their importance. The chapter ends with a discussion of the implications of these findings.

A. IMPORTANT VARIATIONS IN PROGRAM IMPACTS FOR CHILDREN AND FAMILIES WITH DIFFERENT CHARACTERISTICS

Our investigation and interpretation of differences in impacts among subgroups of families was guided by the hypotheses that are discussed in the first subsection below. The next subsection provides a brief overview of our approach to estimating subgroup impacts and conducting analyses to help interpret them. The following subsections present the analysis findings for key subgroups.

1. Guiding Hypotheses

Child's Age at Enrollment. Impacts may differ among families in which the mother enrolled while pregnant and families in which the mother enrolled during the child's first year of life because the duration of program participation is potentially longer (by as much as 15 months) among those who enrolled before the child was born. Among program group families, those who enrolled while pregnant remained enrolled for an average of 25 months, while those who enrolled after their child was born remained enrolled for an average of 22 months. At each assessment point (2 and 3 years of age), the children who were enrolled prenatally had greater exposure, on average, to program services than children who were enrolled after birth.

Opportunities for improving child outcomes may also be maximized when program staff begin working with families prenatally and ensure that pregnant women receive prenatal care and education (Olds, Henderson, Kitzman, Eckenrode, Cole, and Tatelbaum 1999). Moreover, pregnancy may be a time when parents are more open to intervention services as they work through changes in their lives (Duncan and Markman 1988; Brazelton and Cramer 1991; Osofsky and Culp 1993).

Birth Order. Opportunities for changing parenting behavior and improving child outcomes may be maximized when program staff begin working with first-time parents who may be feeling uncertain about their new roles as parents and most receptive to program guidance related to parenting (Olds, Henderson, Kitzman, Eckenrode, Cole, and Tatelbaum 1999).

Impacts may be smaller among families of later-born children if they have established patterns of parenting behaviors with earlier children that are difficult to change. On the other hand, impacts may be larger if parents enrolling with later-born children have faced challenging parenting experiences in the past and therefore value help with parenting more than first-time parents, if the program helps parents with several children to pay special attention to their infant, or if direct services to children compensate for limited attention from parents with several children.

Age of Mother When Child Was Born. Teenage mothers are likely to be less emotionally mature than older mothers, and they may be struggling with their own developmental needs and less receptive to some services directed toward their children's development (Wakschlag et al. 1996; Moore, Brooks-Gunn, and Chase Lansdale in press; Chase-Lansdale and Brooks-Gunn 1994). Perhaps because they are often less emotionally mature, program staff regarded teenage mothers as harder to serve. Staff rated fewer teenage parents as consistently highly involved in the program (30 percent compared with 40 percent of older mothers). Thus, impacts may be smaller among teenage parents.

On the other hand, because teenage parents and their children face higher risks for poor outcomes than older mothers (see for example, Maynard 1996), those whom the programs are able to engage in services may benefit more. Also, center-based child development services might help teenage mothers stay in school and enhance children's cognitive development (Brooks-Gunn, Fuligni, and Berlin 2000).

Because teenage parents and their children face higher risks of poor outcomes, they are often the targets of intervention programs. If teenage parents in the control group were more likely than older mothers in the control group to obtain similar services, Early Head Start impacts on teenage parents and their children might be smaller than those for older parents.

Race/Ethnicity. Impacts may differ among racial/ethnic groups because of cultural differences affecting families' receptiveness to formal support services, and in the case of Hispanic families, language barriers that may interfere with services, especially services and resources to which Early Head Start refers them in the community. The impacts may also differ because pre-existing cultural practices or attitudes related to parenting or child development may interact in unique ways with program services. Early Head Start programs are expected to provide services that meet families' needs and are given wide latitude for designing services that are culturally appropriate.

Nevertheless, families from different cultural backgrounds may experience and respond to various Early Head Start services differently. The average duration of Early Head Start enrollment was slightly longer among African American families (23.3 compared with 21.9 and 22.9 months in white and Hispanic families), and African American and Hispanic families were more likely than white families to remain enrolled for two years or longer (55 and 58 percent compared with 48 percent). On the other hand, program staff were more likely to rate Hispanic and white families as consistently highly involved in the program (41 and 38 percent compared with 32 percent). These variations in the duration and level of program involvement may contribute to differences in program impacts.

Cultural biases in child and parenting outcome measures could also contribute to variations in impacts by race/ethnicity. We attempted to minimize these biases by choosing measures that had previously been shown to work well in varied racial and ethnic groups. In addition, as we examined the psychometric properties of the child and family measures, we calculated internal consistency alphas for each of the three major racial/ethnic subgroups. For the most part, the measures appeared to be appropriate for all groups of children and families. Nevertheless, it is possible that cultural biases could affect the measures in other ways.

Number of Risk Factors. All Early Head Start families are at risk of poor outcomes due to poverty. Some are at greater risk than others, however. In order to distinguish families with different levels of risk, we counted the number of demographic risk factors that families had when they enrolled (in addition to being low income, a characteristic that most Early Head Start families shared). Some of the risk factors tended to occur together, and when they did, families were considered higher-risk families. We counted up to five risk factors: (1) being a single parent; (2) receiving public assistance; (3) being neither employed nor in school or job training; (4) being a teenage parent; and (5) lacking a high school diploma or GED. To form subgroups of reasonable size, we divided families into three groups based on the number of risk factors they had when they enrolled: (1) families who had zero, one, or two risk factors; (2) families who had three risk factors; and (3) families who had four or five risk factors.

Impacts among families with varying numbers of risk factors may differ for two possible reasons. First, program staff reported that it was harder to engage and serve higher-risk families, and they often found it necessary to address critical economic and social support needs before parents in this group were able to focus on child development services. The challenges of serving families with more risk factors are reflected in lower average durations of program enrollment, a lower likelihood that they remained enrolled for at least two years, and smaller percentages rated by staff as consistently highly engaged in the program. For that reason, program impacts on service use, especially intensive service use, may be smaller among families with more risks, and as a result, child and parenting outcomes might also be smaller among these families. Second, in the control group, families with more risks may have had more difficulty than families with fewer risks with obtaining similar services in the community. For that reason, impacts might be larger among families with more risks.

On balance, impacts on families with more risks may be smaller or larger than those on families with fewer risks. The evaluation of the Infant Health and Development Program found that among children in poor families, the effects of the intervention were largest for those with low or moderate risks, and there was no impact on cognitive development when risks were high (Liaw and Brooks-Gunn 1994).

Maternal Risk of Depression. For 8 of the 17 research programs, data on depressive symptoms were collected at the time of enrollment. Mothers who reported depressive symptoms and were at risk of depression when they enrolled may have been struggling with their own mental health needs and less receptive to some services directed toward their child's development. Program staff also regarded mothers with mental health needs as harder to serve. Thus, we might expect smaller impacts on the parenting and child development outcomes among families of depressed mothers. On the other hand, mothers in the control group who were at risk of depression may have been less likely than control-group mothers who were not at risk of depression to seek other services, and the Early Head Start programs may have had a greater opportunity to have an impact on parenting and child outcomes among families of mothers at risk of depression.

2. Approach to Estimating and Interpreting Subgroup Impacts

Our basic approach to estimating subgroup impacts was to average site impacts across sites where there were at least 10 program and 10 control group families in the subgroup. When this strategy resulted in several sites being omitted from some subgroups, we tested the sensitivity of the findings to this assumption by pooling data across sites and using all available observations from all sites to estimate impacts.[2]

Caution must be used in interpreting the variations in impacts among subgroups of families. The subgroups are defined on the basis of a single family characteristic, yet they may also differ in other characteristics. These other unaccounted-for variations in family characteristics may also influence the variations in impacts. Thus, in our analyses we focus on patterns of impacts across outcomes and consider the potential role of other differences in characteristics that may have influenced the outcomes examined. We also conducted analyses in which we controlled for multiple characteristics simultaneously to help assess the extent to which confounding of characteristics may account for the results from the basic approach.[3] However, these analyses cannot control for differences in unmeasured characteristics and it is not possible to rule out all potential sources of confounding.

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[2] Appendix Tables E.IV.1 and E.IV.2 show the configuration of family characteristics across the research sites.

[3] Appendix Table E.VII.1 describes the overlap in subgroups.

In discussing the subgroup findings below, we focus on several different aspects of the findings. We compare impacts across family subgroups and focus primarily on those differences in impacts that are statistically significant. We also discuss impacts within particular subgroups that are statistically significant or relatively large (in terms of effect sizes). Some of the family subgroups are small and power to detect significant differences is low. In these subgroups, especially, we note relatively larger impacts even when they are not statistically significant in order to identify patterns of findings. In drawing conclusions from the impact estimates, we focus on patterns of impacts across outcomes.

3. Variations in Impacts By Mother's Pregnancy Status at Enrollment

Impacts on Service Use. Impacts on service use among families in which the mother enrolled while pregnant with the focus child tended to be larger than those among families in which the mother enrolled after the focus child was born (see Table VII.1 at the end of the chapter). This generally reflects higher rates of service receipt by families in the program group who were pregnant when they enrolled.

The impacts on receipt of *intensive* services also tended to be larger among families who enrolled while pregnant. One exception to this pattern is in the area of child care services, where the impacts on average hours per week in center-based child care and average weekly out-of-pocket child care costs were larger among families who enrolled after the focus child was born. This likely reflects the fact that pregnant women did not need child care services during the early portion of the follow-up period and were more likely to be receiving home-based services initially.

Impacts on Child and Family Outcomes. Early Head Start had a favorable impact on the cognitive and language development and social-emotional behavior of 3-year-old children whose mothers entered the program while pregnant and those who entered during their first year of life, but the impacts tended to be greater for children whose mothers entered during pregnancy (Table VII.2). Impacts on average Bayley MDI scores were positive and statistically significant among children whose mothers entered during pregnancy. Some impacts on positive social-emotional behavior were favorable and statistically significant for both subgroups, but they were often larger for children whose mothers entered Early Head Start during pregnancy. Early Head Start participation led to a significant reduction in the children's sustained attention with objects and engagement of their parents during semi-structured play for both subgroups, but the impacts were larger for children whose mothers entered the program during pregnancy. In addition, the programs had significant favorable impacts on children's negativity toward their parents, children's engagement of their parents in the puzzle challenge task, and persistence in the puzzle challenge task among children whose mothers enrolled during pregnancy.

For some aspects of parenting behavior, the impacts of Early Head Start were larger among mothers who entered during pregnancy, while for other aspects of parenting behavior, the impacts were larger among mothers who entered during their child's first year of life. Impacts on the overall organization, emotional support, and support for cognitive development of the home were favorable for both groups of parents, but were statistically significant only for families entering during the child's first year of life. Impacts on the parent's stimulation of language and learning were generally favorable and sometimes statistically significant for parents entering the program in the child's first year of life, but were not statistically significant (and not always favorable) for parents entering during pregnancy. Impacts on emotionally-supportive parenting behavior, while positive and statistically significant for both groups, were often larger for parents entering Early Head Start during pregnancy. Early Head Start tended to reduce negative parenting behavior among both groups of parents, but the subgroup impacts in most cases were not statistically significant. Early Head Start reduced spanking more among parents who enrolled during pregnancy than those who enrolled after their child was born.

When the children were 3 years old, Early Head Start participation led to higher rates of self-reported symptoms of depression among mothers who entered the program during pregnancy. A similar impact on depression was not found when children were 2 years old, however, suggesting that families who enrolled during pregnancy and participated in Early Head Start until their children were 3 years old may have been experiencing some distress associated with transitioning out of Early Head Start.[4] Impacts on symptoms of depression were favorable for parents entering Early Head Start in the child's first year of life, but not statistically significant.

Early Head Start led to greater participation in self-sufficiency activities among parents in both groups (Table VII.3). The favorable impacts on overall participation in education and training programs were statistically significant for both groups of parents. The impacts over time were more consistent among parents who enrolled during their child's first year of life. The impacts on quarterly participation in education programs among these parents were consistently positive and statistically significant beginning in the third quarter after enrollment and extending throughout the remaining follow-up period.

The somewhat stronger pattern of impacts in most areas among families that enrolled while pregnant is consistent with the longer duration of services they received and their potentially greater receptiveness to services. This pattern of impacts suggests that it may be advantageous to enroll families prenatally when possible.

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[4] In discussion with program directors about the process of transitioning families out of Early Head Start when their children were nearing 3 years old, we learned that some families were distressed about having to leave and did not respond to transition planning as anticipated. It is possible that these families were more likely to be those who had been in Early Head Start since before their child was born.

It is important to note, however, that the Early Head Start programs also had significant favorable impacts on children and parents who enrolled after their child was born. The results suggest that it is not too late to make a difference after the child is born.

The differences in impacts when children were 3 years of age between families who enrolled during pregnancy and families who enrolled after the child was born tended to be less consistent across outcomes than they were when children were 2 years of age. Over time, the difference in potential exposure to program services appears to have made less of a difference in program impacts.

4. Variations by Child's Birth Order

Impacts on Service Use. Impacts on service use and receipt of intensive services tended to be larger among families in which the focus child was not the firstborn child (Table VII.4). One exception is that the impacts on use of any child care and use of center-based child care were larger among families who enrolled with a firstborn child (although the impact on average hours per week of center-based care was virtually the same in the two groups).

Impacts on Child and Family Outcomes. The favorable Early Head Start impacts on children's cognitive and language development did not differ significantly among firstborn and later-born children (Table VII.5). Most impacts on children's social-emotional behavior also did not differ significantly, but the favorable impact on children's engagement of their parents during play was significantly larger among firstborn children. The patterns of impacts on child outcomes are similar to those observed when children were 2 years old.

Similarly, Early Head Start tended to have favorable impacts on the parenting behavior of parents who entered the program with firstborn and parents who enrolled with later-born children. Impacts were more often statistically significant for parents of firstborn children, but this subgroup was somewhat larger than the subgroup of parents with later-born children. Early Head Start impacts on discipline were significant and much larger among parents who enrolled with later-born children. Early Head Start had no significant impacts on the self-reported mental health of parents who entered the program with either firstborn children or those who enrolled with later-born children.

Early Head Start boosted participation of parents in self-sufficiency activities, but the pattern of activities affected varied across the groups (Table VII.6). The Early Head Start programs increased participation by parents of firstborn children in education activities overall and consistently increased the participation of parents of firstborn children in educational activities significantly in the third through eighth quarters after enrollment. Early Head Start more consistently increased employment rates among parents of later-born children. Parents of later-born children participating in Early Head Start were more likely than similar control group parents to be employed, especially in the earlier quarters of the follow-up period. The programs also significantly reduced the proportion of parents of firstborn children who had another birth during the first two years after enrollment.

Confounding with other factors does not appear to account for the patterns of findings described above. The patterns of impacts among families who enrolled with firstborn and later-born children are similar when other factors are controlled simultaneously in multivariate models. These models continue to show that the programs had favorable impacts on both groups of families. Although we expected to find larger impacts among firstborn children and their parents, the evaluation findings support the value of intervention for both firstborn and later-born children.

5. Variations in Impacts Among Teenage and Older Mothers

Impacts on Service Use. Program impacts on service use and on intensity of services received were consistently larger among older mothers than teenage mothers (Table VII.7). For many types of services, teenage mothers in the control group were more likely than older mothers in the control group to receive services and to receive intensive services, reflecting the availability of supportive services for teenage parents in many communities. At the same time, service receipt, particularly receipt of intensive services, by teenage mothers in the program group tended to be lower than service receipt by older mothers in the program, consistent with staff perceptions that it was harder to serve teenage mothers. The only exception was child care use by teenage mothers in the program group, which was generally higher than child care use by older mothers in the program group.

Impacts on Child and Family Outcomes. The Early Head Start impacts on the average levels of cognitive development of 3-year-old children did not differ significantly between children of teenage and older mothers. Early Head Start participation, however, raised the proportion of children of teenage parents who received Bayley MDI scores above the threshold score of 85 by a significantly greater amount (Table VII.8). In the control group, teenage mothers were much more likely than older mothers to have children who received Bayley MDI scores below 85; Early Head Start participation led to reductions in the proportion of children of teenage mothers who received low scores to the level found among older mothers. The program significantly improved the language development of children of older mothers, but had no statistically significant impacts on the language development of children of teenage mothers.

Early Head Start had favorable impacts on the social-emotional behavior of children of both teenage and older mothers. Impacts on engagement of the parent in play were positive and significant for both groups of children. The impact of Early Head Start on sustained attention to objects during play was significantly greater for children of teenage parents than for children of older parents. Early Head Start reduced negativity toward the parent in play and aggressive behavior problems among children of older mothers. The impacts on negativity and aggression among children of teenage mothers were favorable and not statistically different from the impacts for older mothers, but they were not large enough to be statistically significant.

Early Head Start had favorable impacts on a broad set of measures of parenting behavior for older mothers, but also had significant impacts on the parenting behavior of teenage mothers in a few areas (supportiveness and discipline). Scores on the HOME were significantly increased among older mothers participating in Early Head Start. Supportiveness during parent-child play was enhanced significantly for both teenage and older mothers. Parent stimulation of the child's language development and learning, including daily reading, was generally enhanced for older mothers, but no impacts were detected for teenage mothers. Early Head Start generally had no significant impacts on negative parenting behavior for either teenage or older mothers, with one exception. The proportion of parents who reported using physical punishment in the past week was significantly lower for both teenage and older parents, and the use of physical punishment as a discipline strategy tended to be lower for both groups. The pattern of impacts on parenting outcomes among older mothers was stronger when children were 3 years old than when they were 2 years old.

Early Head Start had no impacts on the mental health of either teenage or older parents when children were 3 years old. The significant reductions in parental distress and dysfunctional parent-child interactions found among teenage parents when children were 2 years old did not persist.

Early Head Start led to greater participation in self-sufficiency activities by both teenage and older parents (Table VII.9). Early Head Start increased the likelihood that parents participated in education programs, increasing the enrollment of teenage mothers in high school programs and increasing the enrollment of older mothers vocational education programs. Early Head Start also increased employment rates among older mothers but had no significant impact on the employment of teenage mothers.

These findings reflect the emphasis Early Head Start programs tended to place on pursuing education so that parents might qualify for higher-wage jobs with fringe benefits. Education was a goal particularly for parents who had not finished high school, many of whom were teenage parents. It is notable that Early Head Start increased participation in education programs among teenage parents, even when control-group participation was high, probably because organizations in many communities also support education for teenage parents, and new requirements for welfare recipients mandate school attendance for unmarried parents under 18 years old. Although the Early Head Start programs increased participation rates in education programs among teenage parents, they did not significantly increased the proportion of teenage parents who had completed a high school degree or GED by two years after enrollment.

Initially, the Early Head Start programs increased welfare receipt among teenage mothers, but by the last two quarters of the follow-up period, the programs had begun to reduce welfare receipt among teenage parents significantly. The programs did not have a significant impact on welfare receipt among older mothers.

Confounding with other factors does not appear to account for these patterns of impacts. The estimated impacts are similar when other factors are controlled. The weaker pattern of impacts on child development and parenting among teenage parents and their children supports the hypothesis that teenage mothers were less mature and less receptive than older mothers to services directed toward their children's development.

6. Variations in Impacts by Race/Ethnicity and Language

We examined impacts for three racial/ethnic groups: non-Hispanic, African American families; Hispanic families; and white, non-Hispanic families. The numbers of families in other racial/ethnic groups were too small to examine impacts for them separately. Because language differences may be related to cultural differences and help us understand the differences in impacts among racial and ethnic groups, we also examined impacts for families whose primary language was English and families whose primary language was not English (usually Spanish).

Impacts on Service Use. Impacts on service use were large and significant in all racial/ethnic groups (Table VII.10). Impacts on use of any services by Hispanic families by 28 months after enrollment tended to be much larger than for other families, primarily because Hispanic control group families were much less likely than other control group families to receive services.

Impacts on receipt of *intensive* services—core child development services at the required intensity, weekly home visits, and weekly case management—during the 28-month follow-up period were largest among white, non-Hispanic families, primarily because service receipt by program group members was highest among white families. However, impacts on average hours of center care per week were largest for Hispanic families and families whose primary language was English (Table VII.13).

Impacts on receipt of weekly home visits were larger among English-speaking families in the first follow-up period, but larger among non-English-speaking families in the second and third follow-up periods. The impacts on receipt of weekly home visits in at least one follow-up period and in all three follow-up periods were similar in the two groups.

Impacts on use of services and receipt of intensive services by African American families by 28 months after enrollment tended to be smaller than the impacts for other families. This pattern often reflects relatively higher levels of service use among African American control group members as well as relatively lower levels of service use among African American program families. However, the impacts on child care use by African American families, while smaller than those for Hispanic families, were larger and more often significant than those for white, non-Hispanic families. Levels of child care use tended to be highest among African American families in both groups relative to their counterparts among Hispanic and white families.

Impacts on Child and Family Outcomes. The Early Head Start impacts on average levels of cognitive and language development did not differ significantly among families of different racial and ethnic backgrounds. Although the impacts in individual racial/ethnic groups were not statistically significant, Early Head Start had a significantly more favorable impact on the proportion of children scoring below 85 on the Bayley MDI among Hispanic households and households in which the primary language was not English (Table VII.14). The impact on the average PPVT score was positive and significant for African American children. Although it was not statistically significant, the reduction in the proportion of children who scored below 85 on the PPVT-III was significantly greater among African American children. Similar impacts on language outcomes were found when children were 2 years old.

Early Head Start appears to have improved language development among Hispanic children as well. The impact on the average PPVT score was positive but not statistically significant for Hispanics because some children in this group completed the PPVT and some completed the

TVIP.[5] The impact of Early Head Start on TVIP scores was also positive but not statistically significant for Hispanic children. The positive trend in the scores on both assessments suggests that overall, it is likely that Early Head Start improved language development for Hispanic children. These potential positive impacts on language outcomes among Hispanic children were not apparent at the earlier assessment.

Early Head Start had statistically significant, favorable impacts on the social-emotional behavior of 36-month-old African American children, while the impacts on the behavior of white or Hispanic children were not significant. Among African American children, Early Head Start participation led to reduced aggressive behavior and child negativity toward the parent in a semi-structured play task, enhanced children's sustained attention with objects and engagement of the parent in the play task, and increased children's engagement of their parents and persistence in a puzzle challenge task. The impacts on African American children were more consistent and larger than those seen when the children were 2 years old. The few significant impacts on white children's social-emotional behavior observed at 2 years of age did not persist when the children were 3 years old.

The impacts of Early Head Start on parenting when children were 3 years old are generally consistent with the impacts on children's development and behavior. Early Head Start enhanced emotionally-supportive parenting among African American parents and reduced intrusiveness during semi-structured play and during a puzzle challenge task among African American parents. Impacts were negligible for white and Hispanic parents. The favorable impacts on emotionally supportive parenting and the reduction of negative parenting behavior among African American parents may partly explain the favorable impacts on African American children's behavioral outcomes.

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[5] Children who spoke English as the primary language in the home were assessed using the PPVT; children who spoke Spanish as the primary language in the home were assessed using the Teste de Vocabulario en Images Peabody (TVIP), the Spanish-language version of the PPVT. Among the subgroup of Hispanic children, 90 were assessed using the PPVT and 174 were assessed using the TVIP.

Program impacts on parents' stimulation of language and learning were significantly greater among both African American and Hispanic parents, and the programs increased the percentage of Hispanic parents who reported reading to their children daily as well. These impacts may partly explain the favorable impacts on cognitive and language development for African American and Hispanic children.

The range and size of Early Head Start impacts on parenting among African American families increased over time. More impacts on parenting were significant, and impacts tended to be larger when children were 3 years old. The impacts on parenting observed among white families when children were 2 years old did not persist when children were 3 years old.

Early Head Start improved aspects of mental health among African American parents, but appears to have had unfavorable impacts on the mental health of white parents. Parental distress and parent-child dysfunctional interaction were significantly reduced among African American parents participating in Early Head Start, while Early Head Start appears to have increased parent-child dysfunctional interaction among participating white parents.

Patterns of program impacts on self-sufficiency activities varied among the racial/ethnic groups (Table VII.12). The Early Head Start programs increased the proportion of African American parents who were employed at some time during the two-year follow-up period, but in the final two quarters of the follow-up period, positive impacts on participation in education activities also emerged. Early Head Start increased participation in education activities and reduced employment among Hispanic parents early in the follow-up period, but later in the follow-up period, the impacts on participation in education activities faded and positive impacts on employment emerged. Among white families, Early Head Start led to an increase in participation in education programs, particularly in the second year of follow-up, but had no significant impacts on employment. Program participation led to a significant reduction in subsequent births during the two years after enrollment among white and Hispanic families.

Early Head Start increased the receipt of TANF cash assistance significantly among Hispanic families but not among the other groups of families. Among control families, levels of TANF receipt were much lower among Hispanic than other groups of families. The programs brought the levels of TANF receipt among Hispanic families closer to the levels for program families in other racial/ethnic groups, but they remained lower. It appears that the Early Head Start programs helped some eligible Hispanic families who may have had reservations about seeking cash assistance or had language barriers to obtain the assistance they needed.

The notably strong favorable pattern of impacts for African American families, the pattern of favorable impacts for Hispanic families, and the lack of significant impacts among white non-Hispanic families persist when impacts are estimated by pooling data across sites and eliminating the requirement that there be ten program and ten control families in the subgroup for a site to be included in the analysis.[6]

To the extent that it is possible to investigate, confounding with other characteristics does not appear to explain the pattern of impacts by race/ethnicity. African American families were more likely to be served in mixed-approach programs, and the parents were more likely to be teenage mothers in school or training who entered the programs with firstborn children. Hispanic families were less likely to speak English as their primary language, less likely to have completed high school or a GED, older, more likely to enroll with later-born children, and more likely to be served in programs that were fully implemented later. White families were more likely to be lower-risk families served in home-based programs and programs that were early implementers. However, when we estimated multivariate models controlling simultaneously for multiple site and family characteristics, the pattern of impacts by race/ethnicity persisted. Nevertheless, it is possible that confounding with other unmeasured characteristics may explain the differences in impacts by race/ethnicity.

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[6] The requirement of 10 program and 10 control families in the subgroup causes six sites to drop out of the analyses for African American families, nine sites to drop out of the analyses for Hispanic families, and five sites to drop out of the analyses for white families.

The status of African American control group children and families relative to the control families for other racial/ethnic groups may have set the stage for the Early Head Start programs to make a larger difference in the lives of the African American children and parents they served. For example, African American control group children had lower Bayley MDI scores than either Hispanic or white children, and lower PPVT-III scores than white children. Non-Hispanic white children in the control group tended to be in a more favorable position than African American and Hispanic children in the control group (Table VII.11). Similarly, non-Hispanic white parents in the control group tended to demonstrate the most favorable parenting behaviors and African American parents in the control group tended to demonstrate the least favorable parenting behaviors, and in some cases the differences among the racial/ethnic groups were large.

Although the impacts on service use tended to be smaller among African American families, because control group families were more likely to receive services, the services received by the control group families were less likely to be intensive and may not have been as effective as those provided by Early Head Start. In particular, levels of child care use, including use of center-based care, were relatively high among African American families in both the program and control groups. Differences in the quality of child care used by the two groups may have contributed to the larger impacts on child development outcomes in this group.

It is notable that white, non-Hispanic families in the control group were more likely than other control group families to report that their child was eligible for early intervention services and more likely to receive such services, suggesting that white children in this sample may have been more likely to have a disability. It is likely that the early intervention services received by some white control group families and children were comprehensive and in many ways similar to the Early Head Start services received by program families.

In both the program and control groups, the parents in white families received higher scores on the CES-D and were more likely to be experiencing moderate or severe depression when their children were 3 years old than African American and Hispanic parents. These differences were apparent when children were 2 years old as well. The higher incidence of depression among white parents may have contributed to greater challenges for programs in serving white families and less success in achieving impacts with them.

The evaluation of the Infant Health and Development Program (IHDP) also found stronger effects for African American families (Brooks-Gunn et al. 1993). However, these stronger effects were due largely to differences in education. IHDP's effects on cognitive and language development when children were 3 years old were found for children of African American and white mothers with less than a high school education and for those with a high school diploma but no more, but not for those with more than a high school education (Brooks-Gunn et al. 1992). Almost no early studies of similar programs included a sufficient number of white families to allow comparisons of impacts by race-ethnicity. First and second generation evaluation studies included mostly African American families, with a few Hispanic families also included.

7. Variations in Impacts By Number of Demographic Risk Factors

As noted earlier, we examined variations in impacts by the number of demographic risk factors by dividing the sample into three subgroups: (1) families with zero to two risk factors;

(2) families with three risk factors; and (3) families with four or five risk factors).

Impacts on Service Use. Impacts on service use and receipt of intensive services tended to be larger among families with fewer than three demographic risk factors (Table VII.16). This often reflects higher levels of service use by program families with fewer risk factors, compared with program families with more risk factors, consistent with program staff perceptions that higher-risk families were harder to serve. Impacts on child care use were similar among lower- and higher-risk families. The estimated impacts on receipt of core child development services at the required intensity throughout the follow-up period and on the use and intensity of center-based child care were notably smaller among the small group of families with four or five risk factors.

Impacts on Child and Family Outcomes. Early Head Start impacts on the cognitive and language development and behavior of 3-year-old children differed significantly among families with different numbers of risks (Table VII.17). Children in families with two or three risk factors experienced a significant favorable impact on their Bayley MDI scores. Children in families with fewer risk factors experienced the greatest reduction in the proportion with PPVT-III scores below 85. The impacts of Early Head Start on the cognitive and language development of children in the families with more than three risk factors, however, were unfavorable. The impact on average PPVT-III scores was negative and statistically significant.

The estimated program impacts on children's social-emotional behavior often did not differ significantly among the groups of families with different numbers of risk factors. Children in the highest-risk families, however, appeared to be unfavorably affected by Early Head Start participation. The impacts on orientation and engagement during the Bayley assessment and persistence and frustration in the puzzle challenge task were unfavorable among families with four or five risk factors. The unfavorable pattern of impacts that was found among this group of families when children were 2 years old persisted when they were 3 years old.

The favorable impacts of the Early Head Start programs on parenting were concentrated among families with three risk factors. Early Head Start had no statistically significant impacts on most parenting outcomes for the families with zero to two risk factors, except for a reduction in the use of physical punishment. Early Head Start had favorable pattern of impacts on parenting outcomes among families with three risk factors, including favorable impacts on outcomes in the areas of parents' emotional support, stimulation of language and learning, negative parenting behaviors, and parents' mental health. The Early Head Start programs had almost no statistically significant impacts on parenting among the parents in families with more than three risks, however, and the impact that was significant was an unfavorable impact on harshness toward the child during the parent interview. A few other impacts on parenting among these parents were relatively large and unfavorable. Again, this pattern is similar to that found when children were 2 years old.

Early Head Start led to a trend toward higher levels of parent-child dysfunctional interaction among parents with less than three risk factors. However, Early Head Start significantly reduced levels of parental distress among families with three risk factors.

Early Head Start had no consistent impacts on participation in self-sufficiency activities by parents with zero to two risk factors (Table VII.18). Early Head Start led to greater participation in education programs by parents with three risk factors. Among the families with four or five risk factors, the Early Head Start programs significantly increased welfare receipt, especially early in the follow-up period. It appears that the programs helped families who needed cash assistance obtain it.[7] Participation in Early Head Start led to significant reductions in subsequent births during the two years after enrollment among the families with four or five risk factors.

The findings suggest that the program was most successful in improving outcomes among families who were in the middle of the range of number demographic risk factors. The unfavorable impacts among the small group of families with four or five risk factors suggests that the services provided by Early Head Start programs may not be sufficient to meet the needs of the families at greatest risk and may not be as effective as other community programs that target these families. The difficulties program staff reported in working with these families may be reflected in the less-favorable outcomes. In addition, the families with the most risks were more likely to be in home-based or mixed-approach programs that were not fully implemented early, and it is possible that the staff turnover and disruptions in staff-family relationships experienced in some of these programs had an adverse effect on the most vulnerable families.

8. Variations in Impacts By Mothers' Mental Health Status

For these analyses, we focused on a subsample of eight programs for which data on parents' feelings of depression were collected at enrollment. Parents were classified as at risk for depression at enrollment if they scored 16 or greater on the CES-Depression scale.

The eight programs for which data were collected on depressive symptoms at baseline included proportionately more mixed-approach programs and proportionately fewer center-based programs than the full sample. The eight programs also included proportionately more early implementers and proportionately fewer later and incomplete implementers. The families served by the eight programs with baseline data on depressive symptoms were similar to the full sample of families on some dimensions, but they were more likely to be white and less likely to be African American or Hispanic; more likely to enroll prenatally; less likely to be teenage mothers; and more likely to have completed high school or a GED. In these sites, approximately half of mothers were at risk of depression when they enrolled.

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[7] Discussions with program directors suggest that the programs took steps to make sure that the highest-risk families received services to meet their basic needs and had a "safety net" under them.

Impacts on Service Use. Impacts on overall service use were similar among those at risk and not at risk of depression when they enrolled (Table VII.20). However, impacts on *intensive* service use tended to be larger among families in which the mother was not at risk of depression. These larger impacts among families not at risk of depression reflect both less receipt of intensive services among control group families and greater receipt of intensive services among program families in this subgroup.

The programs increased the use of any child care significantly only among families in which the mother was not at risk of depression, but they increased use of center-based care in both groups, and increased use of any center-based care more among families in which the mother was at risk of depression (although the impact on average hours per week of center care was higher among families with mothers who were not at risk of depression).

Impacts on Child and Family Outcomes. The impacts of Early Head Start on cognitive development were not significant in either group, and they did not differ significantly between children with mothers at risk for depression at baseline and children with mothers not at risk (Table VII.20). The impacts on average language scores also were not significant in either group, but there was a trend toward a larger program-control difference for mothers not at risk compared with those who were at risk for depression. However, the Early Head Start programs significantly reduced the proportion of children scoring below the threshold of 85 on the PPVT III among children of mothers who were not at risk of depression at enrollment but not among children of mothers at risk.

Early Head Start had a consistent pattern of favorable, statistically significant impacts on the social-emotional behavior of children whose mothers were at risk for depression at enrollment but not among children whose mothers were not at risk. Program impacts on children's engagement of their parents in both play and the puzzle challenge task, persistence in the puzzle challenge task, sustained attention with objects in play, and negativity toward their parents in play were all significant for children of mothers at risk for depression. The impact on child engagement of the parent in the puzzle challenge task was significantly greater than that for children of mothers who were not at risk for depression. The poorer social-emotional behavior of children of control group parents at risk of depression compared with children of control group parents not at risk of depression may have provided a greater opportunity for the programs to have a larger impact on this group of children.

Among parents not at risk of depression at enrollment, the Early Head Start impacts on parenting behavior were mixed. The impacts on emotionally-supportive parenting and most measures of support for language and learning were not significant. However, Early Head Start increased the proportion of parents who reported reading daily to their child more among parents who were not at risk of depression. Early Head Start tended to increase negative parenting behavior during the semi-structured play and puzzle challenge tasks among parents who were not at risk of depression, and the increase in negative regard during play was significant. However, Early Head Start tended to reduce the use of physical punishment among this group of parents.

Early Head Start had some notable statistically significant impacts on parenting behavior of parents at risk for depression at baseline, including significant increases in supportiveness in play and significant reductions in detachment and negative regard during play. Early Head Start also reduced spanking and reduced the severity of discipline that mothers who were at risk of depression reported they would use. The programs also increased the extent to which mothers who were at risk of depression reported following a bedtime routine with their child.

The estimated impacts on parent mental health were mixed among mothers who were at risk of depression at enrollment. Early Head Start significantly increased parent-child dysfunctional interaction among mothers at risk of depression, but also significantly reduced reported depressive symptoms among mothers in this group.

Early Head Start had no consistent impacts on self-sufficiency activities of parents at risk for depression at enrollment (Table VII.21). Among parents who were not at risk of depression at enrollment, Early Head Start increased participation in education and job training. The programs also increased employment in three out of the eight quarters following enrollment among these families.

Although the impacts on the receipt of intensive services were often smaller among families of mothers who were at risk of depression, the impacts on service receipt overall were similar among the two groups of families. The poorer outcomes among control group families in which the mother was at risk of depression at enrollment relative to other control group families in some areas, especially negative parenting behaviors, parent supportiveness, and children's social-emotional development, may have set the stage for the Early Head Start programs to make a larger difference in these areas among families with mothers who were at risk of depression.

9. Other Subgroups Examined

We examined variations in impacts for several other types of subgroups, listed below, but do not discuss the findings here. Tables presenting the impacts for these subgroups are included in Appendix E.

- ***Subgroups based on receipt of welfare cash assistance at enrollment.*** We do not highlight these findings here because different rules for receiving cash assistance were in effect for many of the families in the sample when they enrolled. Also, few differences in impacts on parenting and child development emerged in these subgroups (Appendix Tables E.VII.2 through E.VII.4).

- ***Subgroups based on child's gender.*** We do not highlight these findings because the differences in child impacts that appeared when children were approximately 2 years old diminished or disappeared by the time they were 3 years old (Appendix Tables E.VII.5 through E.VII.7).
- ***Subgroups defined by parents' primary occupation when they enrolled*** (employed, in school or job training, or neither). We do not highlight these findings here because they are generally similar to those for subgroups by number of maternal risk factors (being neither employed nor in school or training is one of the risk factors counted). They suggest that impacts were smaller for the families with the highest and lowest levels of education (Appendix Tables E.VII.8 through E.VII.10).
- ***Subgroups based on the highest grade completed by the primary caregiver*** (usually the mother). We do not highlight these findings here because they are generally similar to those for subgroups by number of maternal risk factors (completing less than 12th grade is one of the risk factors counted). They suggest that impacts were smaller for the families with the highest and lowest levels of education (Appendix Tables E.VII.11 through E.VII.13).
- ***Subgroups defined by the primary caregiver's living arrangements at enrollment*** (living with spouse, living with other adults, or living alone with children). We do not highlight these findings here because they are generally similar to those for subgroups by number of maternal risk factors (being a single parent living alone is one of the risk factors counted). They suggest that there were no significant impacts on child development outcomes and impacts on parenting outcomes were smaller for the families in which the primary caregiver was married and lived with a spouse and for families in which the mother lived alone with her children, and the impacts were greater among families in which the primary caregiver lived with other adults and her children (Appendix Tables E.VII.14 through E.VII.16).

B. THE IMPORTANCE OF PARTICULAR SUBGROUP FINDINGS FOR PROGRAMS AND POLICY

The evaluation results for some of the specific subgroups of families described above are especially noteworthy, because they show that the Early Head Start research programs had some important impacts among groups of families that are often the focus of special policies and programs. Below, we highlight these findings and discuss their importance in the context of past research.

1. Working With Teenage Parents and Their Children

Teenage childbearing is an important policy concern because it affects not only a mother's life but also her child's. Under pre-welfare reform policies, teenage parents were at especially high risk of long-term welfare dependency. Children of teenage parents are more likely than children of older parents to experience poorer health, less stimulating and supportive home environments, abuse and neglect, difficulties in school, teenage parenthood, and incarceration during young adulthood (Maynard 1996).

Although the Early Head Start programs participating in the research were not designed specifically for teenage mothers, they served teenage mothers and had important favorable impacts on the teenage parents and their children that they served. Despite the challenges they reported in serving teenage parents, the Early Head Start research programs were able to provide substantially more services to teenage parents than they would have obtained on their own in their communities. The programs also produced a favorable pattern of impacts on participation in self-sufficiency-oriented activities among teenage parents.

The pattern of Early Head Start impacts on child development and parenting among teenage parents and their children was weaker than that among older parents and their children, but the impacts on teenage parents and their children are notable in comparison with the impacts of other interventions targeting teenage parents. The Early Head Start programs had a favorable impact on the proportion of children of teenage mothers who scored below 85 on the Bayley MDI and children's social-emotional behavior. The programs also had significant favorable impacts on parent supportiveness and reported spanking by teenage parents. Finally, the Early Head Start programs increased participation in education activities and toward the end of the follow-up period, the programs reduced welfare receipt among teenage mothers. The program impact on subsequent births among teenage parents was not significant, but it was negative.

These impacts compare favorably with those of other large-scale programs for disadvantaged teenage parents. The Teenage Parent Demonstration programs, which aimed to increase self-sufficiency among teenage parents receiving welfare cash assistance by requiring them to participate in self-sufficiency-oriented activities (with financial sanctions if they did not) and provided support services to enable them to do so (but did not provide intensive services directly to children), significantly increased mothers' participation in education and employment-related activities and increased their child care use for as long as the requirements were in effect. Based on outcomes measured when children were entering elementary school, the programs did not harm the children of the teenage parents they served, nor did they enhance their development and well-being (Kisker, Rangarajan, and Boller 1998). The voluntary New Chance programs provided comprehensive services to improve self-sufficiency among low-income teenage parents and improve children's well-being by helping parents arrange appropriate child care, making referrals for health care, and offering parenting education classes. Many sites offered on-site center-based child care. As voluntary programs, the New Chance programs experienced difficulties recruiting and retaining mothers in program services (the average duration of program participation was approximately 6 months). The programs had no long-term impacts on employment, earnings, income, or welfare receipt and had few impacts on parenting or children's well-being. The evaluation found small negative impacts on children's social-emotional development, based on mothers' reports, but no significant impacts on teachers' assessments of children's academic performance or school adjustment (Quint, Bos, and Polit 1997).

The Early Head Start impacts on teenage parents and their children also compare favorably with those of other recent smaller-scale programs. Because the nurse home visitation program designed by David Olds and his colleagues targeted disadvantaged first-time parents who were pregnant, many participants were teenage parents. The evaluation of the program in Elmira, New York found that the program increased stimulation of children's language skills and provision of educationally-stimulating toys, games and reading materials among poor, unmarried teenage parents, but there were no enduring impacts on their children's intellectual functioning (Olds, Henderson, and Kitzman 1994). The evaluation of the program in Memphis, where two-thirds of mothers were teenagers when they enrolled, found no program effects when children were 2 years old on children's mental development or reported behavioral problems; however, the program increased the responsiveness and communicativeness of children of mothers with low psychological resources (Olds, et al. 1998).[8] Both programs reduced rates of subsequent pregnancies, and in Elmira, the program improved life-course outcomes (increased employment and education achievements, and reduced welfare dependence) for teenage parents (Olds et al. 1998). The Teen Parents as Teachers Demonstration, which operated in four sites in California, provided monthly home visits and group meetings through the child's second birthday, and for a subset of participants, also provided case management services. The demonstration evaluation showed that the programs increased teenage parents' acceptance of their child's behavior during the HOME, improved children's cognitive development according to the mothers' reports, and reduced opened cases of abuse and neglect, but had no large or consistent impacts on parenting or observed child development (Wagner and Clayton 1999).

The evaluation of Early Head Start suggests that when programs put a high priority on providing intensive services and focus on child development while working with teenage parents on education, employment, and other issues, they can have significant impacts on the children's progress at the same time that they improve teenage parents' progress toward economic self-sufficiency.

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[8] The Early Head Start programs had significant favorable impacts on the social-emotional behavior of children of teenage mothers when the children were 2 years old (ACYF 2001a).

2. Engaging Depressed Mothers

Mothers who are depressed are an important, policy-relevant group. Children of mothers who are depressed are at greater risk of experiencing behavioral, health, and academic problems than children of mothers who are not depressed (Anthony 1983; Gelfand and Teti 1990). In the NICHD Early Child Care Study, mothers reporting chronic symptoms of depression were least sensitive when observed playing with their children, and children whose mothers reported feeling depressed performed more poorly on cognitive-linguistic functioning measures and were rated as less cooperative and more problematic at age 3 (NICHD Early Child Care Research Network 1999). Others studies have also documented more negative parenting behaviors and fewer positive parenting behaviors among mothers who were depressed (Koblinsky, Randolph, Roberts, Boyer, and Godsey 2000). Other problems such as poverty and low literacy may exacerbate these risks (Ahluwalia, McGroder, Zaslow, and Hair 2001; Petterson and Albers 2001). In the Early Head Start control group, the outcomes of children at age 3 were often less favorable among the children of mothers who were at risk of depression when they enrolled.

The smaller impacts on service use among mothers at risk of depression at enrollment, reflecting the lower likelihood that program mothers in that group received intensive services, confirms that mothers who were at risk of depression were harder to engage in services than mothers who were not at risk of depression. Although program group families who were at risk of depression at enrollment were more likely than program group families who were not at risk to report receiving mental health services (32 compared with 22 percent reported receiving mental health services), the reported levels of receipt of mental health services by control families at risk and not at risk of depression were similar to their program group counterparts, and impacts on receipt of mental health services were not statistically significant for either group. Many program staff reported that mental health services were lacking in their communities and described the difficulties they experienced in trying to link families to needed mental health services. The pattern of impacts suggests that the Early Head Start programs were unable to increase their families' access to mental health services beyond what they could have obtained on their own in their communities.

Despite the difficulties they experienced in engaging mothers at risk of depression at enrollment, the programs had notable favorable impacts on children's social-emotional behavior and parenting among families of depressed parents and their children. They increased parents' supportiveness during play and reduced detachment and negative regard during play. They also reduced reported spanking and increased the extent to which mothers followed bedtime routines with their children. The programs also improved the social-emotional behavior of children of mothers at risk of depression during play and during the puzzle challenge task. In most cases, the effect sizes ranged from .2 to .4.

Program impacts on the mental health of mothers who were at risk of depression when they enrolled were mixed. Although the programs increased ratings of parent-child dysfunctional interaction by mothers at risk of depression, they also significantly reduced the symptoms of depression reported by mothers in the CES-D Short Form administered when children were 3 years old.

These impacts on parenting and child development suggest that Early Head Start was a protective factor in the lives of children of depressed mothers. The Early Head Start programs helped mothers who were at risk of depression improve their parenting behavior and thereby improve their children's behavior. These impacts are promising because they may have important implications for the children in the future. Evidence is growing that young children's emotional adjustment is an important predictor of later school success (Raver 2002).

The Early Head Start findings are promising in light of recent evaluations of welfare-to-work programs. Several recent evaluations have found that welfare-to-work programs have increased mothers' depressive symptoms and reduced their feelings of warmth toward their children, and these impacts may have contributed to the unfavorable impacts on children's behavior problems that were observed (Ahluwalia, McGroder, Zaslow, and Hair 2001).

Welfare-to-work programs have consistently had no impacts on employment and earnings among the most-depressed enrollees (Michalopoulos and Schwartz 2001). Thus, it is not surprising that the Early Head Start programs also had no impacts on self-sufficiency-oriented outcomes of mothers who were at risk of depression when they enrolled.

The Early Head Start evaluation suggests that efforts to engage mothers who are at risk of depression in intensive services and focusing on child development while working with mothers on their own needs and goals can have significant impacts on parenting and children's social-emotional behavior at the same time that they appear to improve aspects of the parents' mental health. The potential for improving mothers' mental health may be even greater if Early Head Start programs are able to help depressed parents gain better access to mental health services in the community.

3. Working with High-Risk Families

The impact findings suggest that Early Head Start's potential for making a difference appears to be greatest among families in the middle of the range of demographic risk factors that we measured. Impacts tended to be unfavorable among the small group of families with the highest number of risk factors. It is possible that the services provided by the Early Head Start programs—primarily weekly home visits or regular attendance at centers—were not sufficient to meet the needs of these families, and program expectations for participation may have added to the challenges these parents faced.

The general pattern of impacts by number of maternal risk factors is similar to patterns that have been observed in the past. Other studies examining risk factors and children's development have also found unfavorable outcomes among children in families with four or more risk factors (Jones, Forehand, Brody, and Armistead 2002; Rutter 1979; and Liaw and Brooks-Gunn 1995). Past evaluations of welfare employment interventions have found the largest impacts among moderately disadvantaged subgroups and smaller and fewer impacts among both less and more disadvantaged sample members, although in a recent analysis of subgroup impacts among 20 welfare-to-work programs, impacts were more similar among less- and more-disadvantaged subgroups (Michalopoulos and Schwartz 2001). More recently, a major life change hypothesis has been suggested as an explanation for unfavorable impacts on high-risk families in previous research (Zaslow et al. 2002; and Zaslow and Eldred 1998). It may offer one possible explanation for the negative impacts among families with the most risk factors in Early Head Start This hypothesis suggests that low-income families who have experienced high levels of instability, change, and risk may be overwhelmed by the changes that a new program introduces into their lives, even though the program is designed to help. As a result, the program requirements may create unintended negative consequences for these families. In addition, Early Head Start families with the most risk factors tended to be in later or incompletely implemented programs, some of which had high initial rates of staff turnover that may have exacerbated change and other difficult circumstances in their families' lives.

C. CONCLUSIONS AND IMPLICATIONS

The analyses of impacts among subgroups of children and families show that:

- ***Program impacts on receipt of services were broad-based.*** The Early Head Start programs substantially increased the receipt of child development and other services in all subgroups of families.

- ***Children and parents in most subgroups benefited in some way from the programs, but the extent and magnitude of impacts varied.*** When children were 3 years old, some impacts on child development and parenting were significant in nearly all of the subgroups examined. For some subgroups, such as families with two or fewer demographic risk factors, the significant impacts were limited in size and number, while for other subgroups, such as African American families, significant impacts emerged in multiple areas and were larger in magnitude, with most effect sizes in the 20 to 50 percent range.

- ***Earlier intervention is better.*** The subgroup analyses suggest that it is advantageous to enroll families before their child is born and maximize the time available to work with parents and children. The Early Head Start research programs appear to have been more effective in improving child outcomes in families who enrolled before their child was born than in families who enrolled after their child was born. The programs' impact on cognitive development at age 3 appears to be larger among children who were not yet born at enrollment, and the impacts on children's social-emotional development are more numerous and larger in this group. However, children who were born at enrollment also benefited from the program, and program impacts on parenting were more similar across these groups.

- ***Both firstborn and later-born children benefited from participating in Early Head Start.*** The impacts on some parenting outcomes did not differ significantly between parents of firstborn and later-born children, but the impacts on daily reading to children and discipline strategies were concentrated among parents of later-born children.

- ***Early Head Start appears to have provided a safety net for children's development among some groups of families in which parents may have been struggling with their own economic and developmental needs.*** Like other programs designed to increase self-sufficiency among disadvantaged teenage parents, the Early Head Start programs succeeded in increasing rates of school attendance among teenage mothers. Unlike other large-scale programs, however, the Early Head Start programs also enhanced their children's development. In the eight sites where data on depressive symptoms were collected at the time of enrollment, the Early Head Start programs had a consistent pattern of favorable impacts on parenting and children's social-emotional development in families in which the primary caregiver was at risk of depression at enrollment.

- ***The Early Head Start programs were especially effective in improving child development and parenting outcomes of the African American parents and children who participated and also had a favorable pattern of impacts on the Hispanic parents and children who participated.*** Although other unmeasured family characteristics may account for the stronger pattern of impacts among African Americans, it appears that the Early Head Start services may have been considerably more effective than other child development and family support services that African American control group families received in their communities. Given the relatively high levels of child care use, including use of center-based care, among African American families, the stronger pattern of impacts on children in this subgroup may in part reflect differences in the quality of infant and toddler child care that program- and control-group children received. The relatively poorer circumstances experienced by African American children and families in the control group (relative to control families in other groups) also may have set the stage for the programs to have a larger impact on this group. The substantial impacts on service receipt may account for the favorable impacts among Hispanic families. The lack of impacts on white children and parents may reflect, in part, the lower likelihood that these families remained enrolled in the program for at least two years.

- ***Families with multiple risks usually pose difficult challenges for early intervention and family support programs, and this was true for the Early Head Start programs as well.*** The lack of favorable impacts among families with four or five of the five demographic risk factors we counted suggests that programs may need to reconsider the mix and intensity of services that could help in working with these families. Because families with four or five risk factors were relatively more likely to be in programs that were not fully implemented early, one important focus of efforts to serve the highest-risk families effectively may be full implementation of the Head Start Program Performance Standards.

TABLE VII.1

IMPACTS ON SERVICE RECEIPT DURING THE FIRST 28 MONTHS, BY PREGNANCY STATUS AT ENROLLMENT

	Pregnant with Focus Child			Not Pregnant with Focus Child		
	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant
Any Services						
Any Key Services***[a,b]	97.8	77.7	20.1***	95.4	81.7	13.7***
Any Home Visits Or Center-Based Child Care***	97.2	52.1	45.1***	92.1	58.4	33.8***
More Than 1 Home Visit or 2 Weeks Center-Based Child Care***	96.9	43.9	53.0***	91.3	53.2	38.1***
Home Visits or Center Care at Required Intensity in at Least 1 Followup***	78.5	8.3	70.2***	72.5	15.9	56.6***
Home Visits or Center Care at Required Intensity in All 3 Followups***	26.9	0.6	26.3***	31.5	4.6	26.9***
Home Visits						
Any Home Visits***	96.7	39.8	56.9***	85.2	31.4	53.8***
Any Child Development Services During Home Visits***	95.9	38.1	57.8***	84.3	29.3	55.0***
Weekly Home Visits, 1st Follow-Up Period***	63.9	6.3	57.6***	42.8	2.6	40.2***
Weekly Home Visits, 2nd Follow-Up Period***	46.2	2.5	43.7***	33.8	2.6	31.2***
Weekly Home Visits, 3rd Follow-Up Period***	34.6	1.1	33.5***	28.2	2.4	25.8***
Weekly Home Visits in At Least 1 Followup***	76.8	7.6	69.2***	53.1	5.3	47.8***
Weekly Home Visits in All 3 Followups***	22.4	0.0	22.4***	18.8	0.7	18.1***
Child Care						
Any Child Care***	85.5	78.3	7.2*	86.9	81.1	5.8***
Any Center-Based Child Care***	41.3	24.4	17.0***	52.2	37.8	14.4***
Average Hours Per Week of Center-Based Care	2.6	1.4	1.2*	6.8	3.6	3.2***
Concurrent Child Care Arrangements***	43.2	36.1	7.0	52.8	47.2	5.6**
Average Weekly Out-of-Pocket Cost of Care	$2.77	$2.98	-$0.21	$5.11	$8.50	-$3.39***
Received a Child Care Subsidy***	36.0	33.2	2.9	30.2	33.5	-3.4
Child Was in Care at 12 Months of Age***	55.0	50.3	4.7	69.6	58.6	11.0***
Child Was in Care at 24 Months of Age***	56.4	49.6	6.9	62.8	53.6	9.2***
Case Management						
Any Case Management Meetings***	96.5	58.5	38.0***	85.8	53.8	32.0***
Weekly Case Management, 1st Follow-Up Period***	63.3	10.6	52.7***	43.6	7.9	35.7***
Weekly Case Management, 2nd Follow-Up Period***	45.7	4.5	41.2***	32.1	6.2	26.0***
Weekly Case Management, 3rd Follow-Up Period***	32.6	4.7	27.9***	29.6	4.1	25.5***
Group Activities						
Any Group Parenting Activities***	77.3	37.1	40.2***	69.4	36.2	33.2***
Any Parent-Child Group Activities**	42.7	9.5	33.2***	42.4	13.7	28.7***

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TABLE VII.1 (*continued*)

	Pregnant with Focus Child			Not Pregnant with Focus Child		
	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant
Early Intervention Services						
Identification of Child's Disability***	5.1	2.7	2.4	8.2	5.4	2.8**
Services for Child With Disability***	3.0	1.7	1.4	5.5	3.5	2.1*
Child Health Services						
Any Child Health Services***	100.0	100.0	0.0	100.0	99.7	0.3*
Any Doctor Visits***	100.0	98.6	1.5*	98.6	98.3	0.3
Any Emergency Room Visits***	62.3	58.3	4.0	52.6	53.5	-1.0
Number of Emergency Room Visits for Injuries	0.3	0.3	-0.0	0.2	0.3	-0.1*
Any Dentist Visits***	17.8	18.9	-1.1	31.5	27.8	3.6
Any Screening Tests***	67.8	70.3	-2.6	65.6	65.9	-0.3
Any Immunizations***	99.5	98.4	1.1	98.5	97.5	0.9
Family Development Services						
Any Education-Related Services***	92.9	60.5	32.4***	86.1	56.9	29.2***
Any Employment-Related Services***	85.2	46.0	39.2***	75.2	46.7	28.5***
Any Family Health Services[c]	100.0	100.0	0.0	100.0	100.0	0.0
Any Family Mental Health Services***	24.0	20.9	3.0	23.1	21.8	1.3
Transportation Assistance***	45.0	23.6	21.5***	30.4	23.2	7.3***
Housing Assistance***	66.5	63.6	2.9	57.4	56.8	0.6
Sample Size	**269**	**278**	**547**	**807**	**733**	**1,540**

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] Home visits, case management, center-based child care, and/or group parenting activities.

[b] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups in the first two columns.

[c] There is no variance across subgroups due to lack of variance in level of services.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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TABLE VII.2

IMPACTS ON CHILD AND FAMILY OUTCOMES AT AGE 3, BY PREGNANCY STATUS AT ENROLLMENT

	Pregnant with Focus Child				Not Pregnant with Focus Child			
Outcome	Program Group Paticipants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Child Cognitive and Language Development								
Bayley Mental Development Index (MDI) Standard Score	92.2	89.6	2.6**	20.3	91.2	90.6	0.6	4.6
Percentage with MDI < 85***[d]	25.2	29.6	-4.3	-9.3	28.5	31.0	-2.5	-5.3
Peabody Picture Vocabulary Test (PPVT)-III Standard Score	86.7	86.0	0.7	4.3	82.6	81.1	1.5	9.0
Percentage with PPVT-III < 85***	39.7	46.2	-6.5	-13.1	53.7	55.8	-2.0	-4.1
Child Social-Emotional Development								
Engagement of Parent During Parent-Child Semistructured Play***	5.0	4.4	0.6***	52.2	4.8	4.6	0.2**	15.3
Sustained Attention with Objects During Parent-Child Semistructured Play**	5.1	4.6	0.5***	46.8	5.0	4.8	0.1**	13.2
Engagement of Parent During Parent-Child Puzzle Challenge Task	5.1	4.9	0.3**	30.2	5.0	5.0	0.1	7.6
Persistence During Parent-Child Puzzle Challenge Task*	4.8	4.5	0.3**	29.2	4.6	4.5	0.1	4.7
Bayley Behavioral Rating Scale (BRS): Emotional Regulation	4.0	4.0	-0.0	3.3	4.0	4.0	-0.0	-5.0
Bayley BRS: Orientation/ Engagement	4.0	3.9	0.1	14.4	3.9	3.8	0.0	3.0
Negativity Toward Parent During Parent-Child Semistructured Play	1.3	1.4	-0.2**	-26.6	1.2	1.3	-0.1	-9.4
Frustration During Parent-Child Puzzle Challenge Task	2.6	2.6	-0.0	-0.3	2.7	2.7	0.1	0.3
Child Behavior Checklist—Aggressive Behavior	11.2	11.2	0.0	0.4	10.6	11.2	-0.6	-8.9
Child Health Status								
Child's Health Status	4.0	4.2	-0.2	-16.0	4.0	4.0	0.0	2.8
Percentage of Children in Fair or Poor Health***	6.7	5.6	1.0	3.7	8.0	9.2	-1.2	-4.2
Quality of the Home Environment and Parenting: Overall and Physical Environment								
Home Observation for Measurement of the Environment (HOME) Total Score	27.8	27.0	0.8	16.6	27.5	27.0	0.4*	8.9
HOME Internal Physical Environment	7.8	7.8	0.0	1.6	7.8	7.9	-0.1	-6.1
Parenting Behavior: Emotional Support								
HOME Warmth	2.5	2.3	0.2*	19.4	2.6	2.5	0.1*	9.8
Supportiveness During Parent-Child Semistructured Play**	4.1	3.7	0.4***	40.6	4.0	3.9	0.1*	12.0
Supportive Presence During Parent-Child Puzzle Challenge Task*	4.6	4.3	0.4**	28.8	4.5	4.4	0.1	4.5
Parenting Behavior: Stimulation of Language and Learning								
Percentage of Children with a Regular Bedtime***	52.5	57.7	-5.2	-10.5	61.3	58.2	3.1	6.2
Percentage of Children Who Follow a Bedtime Routine***	65.4	72.8	-7.4	-16.0	69.0	68.7	0.3	0.6

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TABLE VII.2 (*continued*)

	Pregnant with Focus Child				Not Pregnant with Focus Child			
Outcome	Program Group Paticipants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c
HOME: Support of Language and Learning	10.8	10.5	0.3	14.9	10.6	10.3	0.2**	10.4
Parent-Child Play	4.5	4.4	0.1	16.4	4.4	4.4	0.1	6.6
Quality of Assistance During Parent-Child Puzzle Challenge Task	3.6	3.5	0.2	12.6	3.6	3.5	0.1	9.7
Percentage of Parents Who Read to Child Daily***	54.8	59.8	-5.0	-9.9	57.9	53.0	4.9*	9.8
Percentage of Parents Who Read to Child at Bedtime***	28.0	28.7	-0.7	-1.6	32.0	29.4	2.6	5.7
Parenting Behavior: Negative Parenting Behavior								
Detachment During Parent-Child Semistructured Play	1.3	1.4	-0.2**	-25.6	1.2	1.2	-0.0	-6.3
Intrusiveness During Parent-Child Semistructured Play	1.7	1.8	-0.1	-14.5	1.6	1.6	-0.1	-6.3
Detachment During Parent-Child Puzzle Challenge Task	1.6	1.8	-0.1	-15.1	1.6	1.6	0.0	3.3
Intrusiveness During Parent-Child Puzzle Challenge Task	2.7	2.9	-0.2	-13.2	2.6	2.7	-0.1	-5.1
Negative Regard During Parent-Child Semistructured Play	1.4	1.4	0.0	5.1	1.3	1.3	-0.0	-2.1
HOME Harshness	0.4	0.4	-0.0	-2.4	0.3	0.3	0.0	1.5
Percentage of Parents Who Spanked Child in the Past Week***	47.6	58.0	-10.5*	-21.0	46.9	52.3	-5.4*	-10.7
Knowledge of Safety Practices and Discipline Strategies								
Percentage of Parents Who Usually Use a Car Seat Correctly***	64.4	68.0	-3.6	-7.8	70.1	70.0	0.1	0.3
Percentage of Parents Suggesting Physical Punishment as a Discipline Strategy***	51.3	53.4	-2.1	-4.2	46.9	50.5	-3.6	-7.2
Percentage of Parents Who Would Use Mild Discipline Only***	43.5	41.2	2.3	4.7	44.1	41.3	2.9	5.8
Index of Severity of Discipline Strategies	3.5	3.6	-0.1	-7.6	3.4	3.5	-0.1	-7.5
Parent Physical and Mental Health								
Parent's Health Status	3.3	3.5	-0.2	-15.4	3.5	3.5	-0.0	-1.2
Parenting Stress Index (PSI) Parental Distress	24.8	24.2	0.6	6.1	24.9	25.4	-0.5	-4.8
PSI Parent-Child Dysfunctional Interaction	17.9	17.1	0.7	11.5	17.7	17.8	-0.0	-0.7
Center for Epidemiological Studies Depression (CES-D; Short Form)**	8.9	7.5	1.5*	20.7	7.2	7.7	-0.5	-7.6
CES-D Severe Depressive Symptoms ***	19.5	13.4	6.1	17.0	13.4	14.7	-1.4	-3.8
Family Environment Scale (FES): Family Conflict	1.7	1.7	0.1	11.6	1.6	1.7	-0.0	-5.5
Father Presence								
Currently Married To Biological Father ***	26.4	26.7	-0.3	-0.7	34.3	37.6	-3.3	-6.8
Biological Father is Currently Married to, Lives with, or is Boyfriend of Respondent***	40.4	39.6	0.8	1.6	48.9	51.9	-3.0	-6.0
Biological Father Currently Present in Child's Life***	62.8	60.4	2.2	4.8	72.2	72.6	-0.3	-0.7

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TABLE VII.2 (*continued*)

	Pregnant with Focus Child				Not Pregnant with Focus Child			
Outcome	Program Group Paticipants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Continuous Biological Father Presence Child Age 14-36 Months***	56.5	68.7	-12.2*	-26.5	67.4	67.8	-0.4	-1.0
No Biological Father Presence Child Age 14-36 Months***	19.5	14.0	5.5	17.4	12.4	11.9	0.4	1.4
Continuous Male Presence Child Age 14-36 Months***	75.1	83.3	-8.2	-22.9	79.5	82.0	-2.5	-7.0
No Male Presence Child Age 14-36 Months***	5.6	1.2	4.5**	36.9	1.5	1.6	-0.0	-0.2
Sample Size								
Bayley	**221**	**215**	**436**		**658**	**564**	**1,222**	
Parent Interview	**265**	**257**	**522**		**842**	**746**	**1,588**	
Parent-Child Interactions	**219**	**208**	**427**		**655**	**576**	**1,231**	

SOURCE: Parent interviews, child assessments, interviewer observations, and assessments of semistructured parent-child interactions conducted when children were approximately 36 months old.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE VII.3

IMPACTS ON SELF-SUFFICIENCY AT 28 MONTHS, BY PREGNANCY STATUS AT ENROLLMENT

	Pregnant with Focus Child				Not Pregnant with Focus Child			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Education/Job Training								
Ever in Education or Training***[d]	67.9	56.0	12.0**	24.0	59.7	49.9	9.7***	19.5
Ever in High School***	21.2	18.6	2.6	9.3	11.8	7.4	4.4***	15.4
Ever in ESL Class***	0.5	-0.1	0.6	4.3	4.2	3.0	1.3	8.8
Ever in Vocational Program***	24.4	18.7	5.7	15.2	19.8	16.4	3.4	9.0
Average Hours per Week in Education or Training	5.4	4.5	0.9	14.8	4.7	3.3	1.4***	22.0
In Education or Training:								
1st Quarter***	26.0	23.5	2.5	6.1	21.4	22.5	-1.0	-2.5
2nd Quarter***	28.2	21.0	7.3*	16.8	27.3	26.5	0.8	1.8
3rd Quarter***	31.3	30.1	1.1	2.6	32.1	26.4	5.7**	12.8
4th Quarter***	32.2	30.2	2.0	4.8	31.0	24.4	6.6***	15.4
5th Quarter***	32.5	31.7	0.7	1.7	30.3	24.7	5.6**	13.0
6th Quarter***	34.5	28.2	6.4	15.3	29.8	22.4	7.3***	17.6
7th Quarter***	27.1	28.1	-1.1	-2.6	25.7	19.4	6.4***	15.8
8th Quarter***	28.2	27.4	0.8	2.1	26.4	18.2	8.3***	21.1
Have High School Diploma***	49.4	47.8	1.6	3.1	50.5	49.7	0.7	1.5
Have GED***	10.7	9.6	1.1	3.4	10.3	10.6	-0.3	-1.0
Employment								
Ever Employed***	85.5	81.3	4.2	11.2	86.9	84.0	2.9	7.7
Average Hours/Week Employed	11.9	13.3	-1.4	-9.2	17.9	17.9	-0.0	-0.0
Employed in:								
1st Quarter***	30.2	29.2	1.0	2.1	40.3	41.9	-1.6	-3.4
2nd Quarter***	36.8	41.2	-4.4	-8.8	47.5	47.6	-0.2	-0.3
3rd Quarter***	40.9	46.8	-6.0	-11.9	54.6	54.2	0.3	0.7
4th Quarter***	46.7	47.0	-0.3	-0.6	58.6	57.1	1.4	2.9
5th Quarter***	53.0	52.9	0.2	0.3	62.2	61.8	0.4	0.8
6th Quarter***	56.4	53.1	3.3	6.8	65.0	61.2	3.7	7.6
7th Quarter***	49.2	50.6	-1.4	-2.9	62.0	57.7	4.4	8.8
8th Quarter***	53.9	56.0	-2.1	-4.3	64.7	62.3	2.4	5.0
Any Self-Sufficiency-Oriented Activity (Education, Training or Employment)								
Ever Employed or in Education/Training***	94.2	87.9	6.4**	20.9	94.2	90.7	3.5**	11.4
Average Hours per Week in Any Activity	18.0	18.3	-0.3	-1.9	23.2	21.6	1.6*	9.9
In Activities in:								
1st Quarter***	48.7	45.4	3.3	6.5	53.9	54.6	-0.7	-1.3
2nd Quarter***	54.7	53.1	1.6	3.3	64.1	60.8	3.3	6.7
3rd Quarter***	61.3	61.5	-0.2	-0.5	71.4	68.0	3.4	7.2
4th Quarter***	65.5	62.6	3.0	6.2	73.2	67.4	5.8**	12.2
5th Quarter***	69.0	68.8	0.2	0.5	74.3	70.7	3.6	7.8
6th Quarter***	74.4	66.4	8.0*	17.0	77.2	69.5	7.7***	16.5
7th Quarter***	61.3	63.3	-2.0	-4.1	73.4	65.3	8.1***	16.9
8th Quarter***	62.9	68.5	-5.7	-12.2	76.0	68.5	7.6***	16.2

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TABLE VII.3 (*continued*)

Outcome	Pregnant with Focus Child: Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Not Pregnant with Focus Child: Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
AFDC/TANF Receipt								
Ever Received AFDC/TANF***	54.9	54.7	0.2	0.5	45.8	43.0	2.8	5.5
Received AFDC/TANF in:								
1st Quarter***	34.0	35.8	-1.8	-3.8	34.4	31.0	3.4*	7.2
2nd Quarter***	37.0	41.8	-4.8	-10.2	34.3	31.6	2.7	5.6
3rd Quarter***	44.8	41.3	3.6	7.4	34.9	33.9	0.9	2.0
4th Quarter***	39.6	39.2	0.5	1.0	28.9	28.6	0.3	0.6
5th Quarter***	38.9	38.5	0.5	1.0	28.1	28.1	-0.0	-0.0
6th Quarter***	36.3	43.5	-7.3	-15.7	27.6	27.9	-0.3	-0.7
7th Quarter***	23.4	36.8	-13.4***	-30.4	22.2	23.9	-1.8	-4.0
8th Quarter***	24.7	32.4	-7.6	-18.0	21.2	21.8	-0.6	-1.4
Total AFDC/TANF Benefits ($)*	$2,435	$2,774	-$339	-8.8	$2,096	$2,133	-$38	-1.0
Receipt of Other Welfare Benefits								
Ever Received Welfare***	76.4	74.8	1.6	3.4	67.7	65.0	2.7	5.7
Total Welfare Benefits ($)*	$6,678	$6,882	-$204	-2.7	$5,258	$5,407	-$149	-2.0
Ever Received Food Stamps***	68.3	68.8	-0.5	-1.1	60.6	57.6	3.0	6.1
Total Food Stamp Benefits ($)	$2,389	$2,647	-$259	-9.5	$2,130	$1,976	$154	5.6
Income/Poverty								
Income Above Poverty Level***	36.0	39.8	-3.8	-7.8	42.5	42.4	0.1	0.3
Subsequent Births								
Subsequent Birth by 24 Months after Random Assignment***	38.9	44.1	-5.2	-11.5	20.6	22.7	-2.0	-4.5
Sample Size	**269**	**278**	**547**		**807**	**733**	**1,540**	

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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TABLE VII.4

IMPACTS ON SERVICE RECEIPT DURING THE FIRST 28 MONTHS, BY FOCUS CHILD'S BIRTH ORDER

	Firstborn Child			Later Born Child		
	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant
Any Services						
Any Key Services***[a,b]	95.1	80.5	14.6***	97.6	81.8	15.8***
Any Home Visits Or Center-Based Child Care***	94.0	75.8	18.3***	97.1	76.6	20.5***
More Than 1 Home Visit or 2 Weeks Center-Based Child Care***	92.2	57.7	34.5***	96.2	56.3	40.0***
Home Visits or Center Care at Required Intensity in at Least 1 Followup***	79.7	14.8	64.9***	82.0	14.6	67.5***
Home Visits or Center Care at Required Intensity in All 3 Followups***	30.3	3.2	27.1***	37.9	3.5	34.4***
Home Visits						
Any Home Visits***	86.7	34.0	52.7***	91.0	32.8	58.2***
Any Child Development Services During Home Visits***	85.5	31.9	53.6***	90.8	30.0	60.8***
Weekly Home Visits, 1st Follow-Up Period***	43.7	4.2	39.5***	52.6	2.7	49.8***
Weekly Home Visits, 2nd Follow-Up Period***	33.1	2.7	30.4***	48.0	1.8	46.2***
Weekly Home Visits, 3rd Follow-Up Period***	26.5	3.2	23.3***	38.4	1.0	37.5***
Weekly Home Visits in At Least 1 Followup***	54.8	6.4	48.4***	67.5	4.1	63.4***
Weekly Home Visits in All 3 Followups***	16.9	0.3	16.5***	27.0	0.5	26.5***
Child Care						
Any Child Care***	91.3	84.3	7.0***	77.5	73.4	4.1
Any Center-Based Child Care***	51.2	35.3	16.0***	46.0	34.1	11.9***
Average Hours Per Week of Center-Based Care	6.2	2.9	3.2***	6.5	3.2	3.4***
Concurrent Child Care Arrangements***	53.6	48.1	5.5*	47.9	39.4	8.5**
Average Weekly Out-of-Pocket Cost of Care	$4.96	$6.90	-$1.94**	$3.71	$7.71	-$4.00***
Received a Child Care Subsidy***	30.8	32.2	-1.4	27.5	32.0	-4.5
Child Was in Care at 12 Months of Age***	72.8	60.1	12.7***	57.2	46.0	11.2***
Child Was in Care at 24 Months of Age**	68.5	61.2	7.3**	55.3	46.2	9.2**
Case Management						
Any Case Management Meetings***	86.4	55.2	31.2***	89.7	56.5	33.2***
Weekly Case Management, 1st Follow-Up Period***	45.5	9.5	36.0***	52.1	9.3	42.7***
Weekly Case Management, 2nd Follow-Up Period***	31.3	5.1	26.2***	43.9	5.9	38.0***
Weekly Case Management, 3rd Follow-Up Period***	27.9	4.9	23.0***	35.3	4.2	31.2***
Group Activities						
Any Group Parenting Activities***	69.6	37.1	32.5***	72.7	36.6	36.1***
Any Parent-Child Group Activities**	40.9	15.9	25.0***	44.8	12.4	32.4***

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TABLE VII.4 (*continued*)

	Firstborn Child				Later Born Child		
	Program Group	Control Group	Impact Estimate per Eligible Applicant		Program Group	Control Group	Impact Estimate per Eligible Applicant
			Early Intervention Services				
Identification of Child's Disability***	6.5	5.7	0.8		9.9	7.0	2.9
Services for Child With Disability***	4.2	4.2	-0.0		5.7	3.9	1.7
			Child Health Services				
Any Child Health Services***	100.0	99.9	0.2		100.0	99.8	0.2
Any Doctor Visits***	98.9	98.7	0.2		98.9	98.3	0.6
Any Emergency Room Visits***	56.1	53.6	2.5		53.1	52.9	0.1
Number of Emergency Room Visits for Injuries	0.3	0.3	-0.0		0.2	0.2	-0.1
Any Dentist Visits***	27.0	24.3	2.7		30.5	27.9	2.6
Any Screening Tests***	69.1	69.2	-0.1		62.9	60.5	2.4
Any Immunizations***	98.8	98.0	0.8		98.9	97.9	1.0
			Family Development Services				
Any Education-Related Services***	89.2	63.2	26.0***		85.4	49.6	35.8***
Any Employment-Related Services***	77.3	47.1	30.1***		77.2	44.7	32.5***
Any Family Health Service[c]	100.0	100.0	0.0		100.0	100.0	0.0
Any Family Mental Health Services***	22.4	19.4	3.0		25.9	25.3	0.6
Transportation Assistance***	33.0	22.9	10.1***		33.0	22.7	10.4***
Housing Assistance***	55.5	55.0	0.5		62.2	58.2	4.0
Sample Size	**667**	**612**	**1,279**		**399**	**398**	**797**

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroups are included in the estimates for each subgroup.

[a] Home visits, case management, center-based child care, and/or group parenting activities.

[b] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups in the first two columns.

[c] There is no variance across subgroups due to lack of variance in level of services.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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TABLE VII.5

IMPACTS ON CHILD AND FAMILY OUTCOMES AT AGE 3, BY FOCUS CHILD'S BIRTH ORDER

	Firstborn Child				Later Born Child			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Child Cognitive and Language Development								
Bayley Mental Development Index (MDI) Standard Score	91.2	90.0	1.1	8.8	92.7	90.9	1.9*	14.4
Percentage with MDI < 85***[d]	29.1	30.5	-1.8	-3.9	23.6	29.5	-4.9	-10.6
Peabody Picture Vocabulary Test (PPVT)-III Standard Score	83.8	82.3	1.5	9.2	84.9	83.8	1.1	6.8
Percentage with PPVT-III < 85***	49.1	53.3	-4.2	-8.4	49.6	49.0	0.6	1.2
Child Social-Emotional Development								
Engagement of Parent During Parent-Child Semistructured Play**	4.9	4.6	0.3***	26.2	4.7	4.7	0.1	5.1
Sustained Attention with Objects During Parent-Child Semistructured Play	5.0	4.8	0.2**	16.4	5.0	4.8	0.1	13.2
Engagement of Parent During Parent-Child Puzzle Challenge Task	5.0	4.9	0.1	9.4	5.1	5.1	0.0	6.7
Persistence During Parent-Child Puzzle Challenge Task	4.6	4.5	0.1	8.0	4.6	4.6	0.0	1.0
Bayley Behavioral Rating Scale (BRS): Emotional Regulation	4.0	4.0	-0.1	-6.2	4.0	3.9	0.1	8.3
Bayley BRS: Orientation/ Engagement	3.9	3.9	0.0	3.4	3.8	3.8	-0.0	-0.9
Negativity Toward Parent During Parent-Child Semistructured Play	1.3	1.3	-0.1	-10.7	1.2	1.3	-0.1**	-15.2
Frustration During Parent-Child Puzzle Challenge Task	2.7	2.6	0.1	4.4	2.8	2.9	-0.1	-10.0
Child Behavior Checklist—Aggressive Behavior	10.8	11.0	-0.3	-4.0	11.0	11.8	-0.8	-11.9
Child Health Status								
Child's Health Status	4.0	4.0	0.0	2.1	4.0	4.0	-0.0	-2.9
Percentage of Children in Fair or Poor Health***	6.7	8.5	-1.8	-6.5	9.5	8.0	1.5	5.4
Quality of the Home Environment and Parenting: Overall and Physical Environment								
Home Observation for Measurement of the Environment (HOME) Total Score	27.6	27.1	0.5*	10.4	27.6	27.3	0.3	6.6
HOME Internal Physical Environment*	7.9	7.8	0.0	2.2	7.7	7.9	-0.2*	-15.9
Parenting Behavior : Emotional Support								
HOME Warmth	2.5	2.5	0.1	7.3	2.6	2.6	0.1	8.4
Supportiveness During Parent-Child Semistructured Play	4.0	3.9	0.1*	13.1	4.0	3.9	0.1	10.1
Supportive Presence During Parent-Child Puzzle Challenge Task	4.4	4.4	0.1	4.4	4.6	4.6	0.0	2.2
Parenting Behavior: Stimulation of Language and Learning								
Percentage of Children with a Regular Bedtime***	59.2	56.3	2.9	5.9	62.4	62.6	-0.2	-0.4
Percentage of Children Who Follow a Bedtime Routine***	67.6	68.5	-0.9	-1.9	73.4	72.4	0.9	2.0

TABLE VII.5 (*continued*)

	Firstborn Child				Later Born Child			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
HOME: Support of Language and Learning	10.7	10.5	0.2**	11.4	10.5	10.4	0.1	6.4
Parent-Child Play	4.5	4.4	0.1	8.6	4.3	4.2	0.1	10.2
Quality of Assistance During Parent-Child Puzzle Challenge Task	3.6	3.5	0.1	8.9	3.7	3.5	0.2	12.5
Percentage of Parents Who Read to Child Daily***	59.2	56.1	3.2	6.3	52.2	44.3	7.9*	15.9
Percentage of Parents Who Read to Child at Bedtime***	33.0	30.9	2.1	4.6	32.4	28.4	4.0	8.8
Parenting Behavior: Negative Parenting Behavior								
Detachment During Parent-Child Semistructured Play	1.2	1.3	-0.0	-4.2	1.2	1.2	-0.1	-10.2
Intrusiveness During Parent-Child Semistructured Play	1.6	1.6	-0.0	-1.4	1.5	1.5	-0.0	-5.4
Detachment During Parent-Child Puzzle Challenge Task	1.7	1.7	0.0	1.7	1.6	1.6	-0.0	-1.8
Intrusiveness During Parent-Child Puzzle Challenge Task	2.7	2.8	-0.1	-10.8	2.6	2.6	0.0	1.9
Negative Regard During Parent-Child Semistructured Play	1.3	1.4	-0.0	-4.7	1.2	1.2	0.0	3.8
HOME Harshness	0.3	0.3	0.0	5.7	0.2	0.2	-0.1	-7.9
Percentage of Parents Who Spanked Child in the Past Week***	50.1	53.9	-3.8	-7.5	39.1	50.3	-11.2***	-22.5
Knowledge of Safety Practices and Discipline Strategies								
Percentage of Parents Who Usually Use a Car Seat Correctly***	70.9	72.4	-1.5	-3.3	74.4	69.1	5.3	11.5
Percentage of Parents Suggesting Physical Punishment as a Discipline Strategy***	48.9	49.4	-0.5	-1.0	35.9	48.3	-12.4***	-24.8
Percentage of Parents Who Would Use Mild Discipline Only***	42.1	41.7	0.4	0.8	53.9	44.4	9.5**	19.2
Index of Severity of Discipline Strategies	3.5	3.5	-0.0	-2.4	3.0	3.4	-0.4***	-24.0
Parent Physical and Mental Health								
Parent's Health Status	3.5	3.5	0.0	2.5	3.3	3.4	-0.1	-11.5
Parenting Stress Index (PSI) Parental Distress	24.4	25.4	-1.0	-10.5	25.3	26.0	-0.7	-7.7
PSI Parent-Child Dysfunctional Interaction	17.7	17.6	0.1	1.2	18.3	18.3	-0.0	-0.6
Center for Epidemiological Studies Depression (CES-D; Short Form)	7.1	7.4	-0.3	-4.8	8.1	8.5	-0.4	-4.9
CES-D Severe Depressive Symptoms ***	11.7	12.9	-1.2	-3.2	19.0	19.5	-0.5	-1.5
Family Environment Scale (FES): Family Conflict	1.6	1.6	-0.0	-7.4	1.8	1.7	0.0	4.3
Father Presence								
Currently Married To Biological Father ***	30.6	28.1	2.5	5.2	45.3	47.3	-1.9	-4.0
Biological Father is Currently Married to, Lives with, or is Boyfriend of Respondent***	46.6	45.2	1.4	2.9	55.2	57.9	-2.8	-5.5
Biological Father Currently Present in Child's Life***	70.1	68.4	1.7	3.9	76.3	73.2	3.1	6.8

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TABLE VII.5 *(continued)*

	Firstborn Child				Later Born Child			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Continuous Biological Father Presence Child Age 14-36 Months***	63.7	66.5	-2.8	-6.1	72.6	71.6	1.0	2.1
No Biological Father Presence Child Age 14-36 Months***	13.7	13.0	0.7	2.3	11.2	11.3	-0.1	-0.2
Continuous Male Presence Child Age 14-36 Months***	80.1	81.9	-1.8	-5.1	78.0	83.9	-5.9*	-16.5
No Male Presence Child Age 14-36 Months***	1.9	1.6	0.2	2.0	2.6	2.4	0.2	1.9
Sample Size								
Bayley	**537**	**477**	**1,014**		**330**	**302**	**632**	
Parent Interview	**676**	**610**	**1,286**		**420**	**392**	**812**	
Parent-Child Interactions	**536**	**484**	**1,020**		**331**	**300**	**631**	

SOURCE: Parent interviews, child assessments, interviewer observations, and assessments of semistructured parent-child interactions conducted when children were approximately 36 months old.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE VII.6

IMPACTS ON SELF-SUFFICIENCY AT 28 MONTHS, BY FOCUS CHILD'S BIRTH ORDER

	Firstborn Child				Later Born Child			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Education/Job Training								
Ever in Education or Training***[d]	66.7	55.7	11.0***	22.0	47.8	41.6	6.2	12.4
Ever in High School***	19.3	13.8	5.5***	19.4	1.3	1.3	0.0	0.0
Ever in ESL Class***	3.1	1.5	1.6*	11.4	5.5	4.3	1.3	9.0
Ever in Vocational Program***	21.9	18.8	3.1	8.2	14.6	14.9	-0.3	-0.7
Average Hours per Week in Education or Training	6.0	4.0	1.9***	30.2	1.9	2.0	-0.1	-0.9
In Education or Training:								
1st Quarter***	27.3	26.4	0.9	2.3	12.9	14.8	-1.9	-4.5
2nd Quarter***	32.4	29.9	2.5	5.8	15.5	17.5	-2.0	-5.0
3rd Quarter***	38.2	29.1	9.2***	20.8	17.1	21.6	-4.5	-10.2
4th Quarter***	37.1	26.9	10.2***	23.7	19.1	18.5	0.6	1.3
5th Quarter***	36.5	27.6	8.9***	20.6	19.3	19.2	0.1	0.3
6th Quarter***	34.2	25.3	8.9***	21.3	21.6	15.9	5.6*	13.6
7th Quarter***	32.3	23.4	8.9***	22.3	14.7	17.1	-2.4	-6.0
8th Quarter***	31.4	21.9	9.5***	24.2	19.1	14.0	5.0	12.9
Have High School Diploma***	51.1	49.2	1.9	3.9	46.9	50.1	-3.2	-6.4
Have GED***	10.7	12.0	-1.3	-4.0	10.5	10.0	0.5	1.6
Employment								
Ever Employed***	89.8	85.5	4.4**	11.6	81.3	80.3	1.0	2.6
Average Hours/Week Employed	16.7	16.6	0.1	0.8	18.4	17.0	1.4	9.5
Employed in:								
1st Quarter***	37.8	38.2	-0.4	-0.9	43.7	38.5	5.2	10.7
2nd Quarter***	43.9	46.0	-2.1	-4.3	50.4	43.8	6.5*	13.2
3rd Quarter***	51.9	53.4	-1.6	-3.2	56.8	50.6	6.2*	12.4
4th Quarter***	56.7	55.3	1.5	3.0	61.9	54.5	7.4**	14.8
5th Quarter***	61.1	60.8	0.3	0.7	64.1	57.3	6.8*	13.9
6th Quarter***	64.4	59.2	5.2	10.5	64.3	59.1	5.3	10.7
7th Quarter***	62.9	59.1	3.7	7.5	56.3	54.5	1.8	3.6
8th Quarter***	64.6	64.4	0.3	0.5	61.6	54.9	6.7*	13.8
Any Self-Sufficiency-Oriented Activity (Education, Training, or Employment)								
Ever Employed or in Education/Training***	96.2	91.9	4.4***	14.4	90.7	87.3	3.4	11.1
Average Hours per Week in Any Activity	23.4	21.0	2.4**	15.1	20.6	19.2	1.4	9.1
In Activities in:								
1st Quarter***	55.1	54.3	0.8	1.6	51.7	47.9	3.8	7.7
2nd Quarter***	63.2	62.0	1.2	2.5	59.4	52.8	6.7*	13.5
3rd Quarter***	71.6	68.4	3.1	6.6	66.3	62.0	4.3	9.0
4th Quarter***	74.8	67.0	7.8***	16.2	69.4	62.1	7.3**	15.3
5th Quarter***	77.5	72.0	5.5**	12.0	70.1	65.7	4.4	9.5
6th Quarter***	79.5	69.6	9.9***	21.0	72.1	63.7	8.4**	17.9
7th Quarter***	76.8	68.9	7.9***	16.6	62.7	60.7	2.0	4.2
8th Quarter***	78.3	73.0	5.3*	11.4	68.6	61.2	7.4*	15.8

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TABLE VII.6 (*continued*)

	Firstborn Child				Later Born Child			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
AFDC/TANF Receipt								
Ever Received AFDC/TANF***	47.8	44.7	3.1	6.2	42.3	43.8	-1.5	3.0
Received AFDC/TANF in:								
1st Quarter***	32.8	29.3	3.5	7.5	33.6	33.5	0.1	0.1
2nd Quarter***	33.1	31.9	1.2	2.5	33.7	33.7	0.0	0.1
3rd Quarter***	36.0	33.0	3.1	6.4	33.7	35.5	-1.8	-3.7
4th Quarter***	29.4	28.1	1.3	2.9	29.0	31.6	-2.6	-5.6
5th Quarter***	28.6	28.1	0.5	1.1	28.3	30.0	-1.6	-3.6
6th Quarter***	27.4	28.7	-1.4	-3.0	29.1	30.8	-1.7	-3.7
7th Quarter***	21.0	25.0	-4.0	-9.1	25.2	25.1	0.1	0.3
8th Quarter***	20.4	23.6	-3.2	-7.5	23.9	20.5	3.4	8.0
Total AFDC/TANF Benefits ($)*	$1,773	$1,824	-$51	-1.3	$2,716	$2,774	-$58	-1.5
Receipt of Other Welfare Benefits								
Ever Received Welfare***	66.2	64.6	1.6	3.4	67.9	68.4	-0.5	-1.1
Total Welfare Benefits ($)*	$3,970	$4,377	-$406.2	-5.4	$6,735	$6,790	-$55	-0.7
Ever Received Food Stamps***	57.8	56.7	1.1	2.2	62.6	63.9	-1.3	-2.7
Total Food Stamp Benefits ($)	$1,657	$1,560	$97	3.6	$2,633	$2,716	-$83	-3.0
Income/Poverty								
Income Above Poverty Level***	47.7	45.1	2.6	5.3	36.0	41.1	-5.0	-10.2
Subsequent Births								
Subsequent Birth by 24 Months after Random Assignment***	24.4	30.9	-6.5**	-14.4	18.0	23.0	-5.0	-11.0
Sample Size	667	612	1,279		399	398	797	

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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TABLE VII.7

IMPACTS ON SERVICE RECEIPT DURING THE FIRST 28 MONTHS, BY AGE OF MOTHER AT BIRTH OF FOCUS CHILD

	Teenage Mother (19 and Younger)			Older Mother (20 and Older)		
	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant
Any Services						
Any Key Services***[a,b]	94.0	84.1	9.9***	96.6	80.6	16.0***
Any Home Visits Or Center-Based Child Care***	91.5	60.2	31.3***	93.6	54.5	39.1***
More Than 1 Home Visit or 2 Weeks Center-Based Child Care***	89.7	53.3	36.4***	92.9	49.5	43.4***
Home Visits or Center Care at Required Intensity in at Least 1 Followup***	67.2	16.4	50.8***	73.9	11.6	62.3***
Home Visits or Center Care at Required Intensity in All 3 Followups***	23.4	2.4	21.0***	31.2	3.4	27.9***
Home Visits						
Any Home Visits***	85.2	36.2	49.0***	87.8	31.7	56.1***
Any Child Development Services During Home Visits***	83.7	33.7	50.0***	87.0	28.8	58.2***
Weekly Home Visits, 1st Follow-Up Period***	40.7	5.0	35.7***	46.1	2.5	43.6***
Weekly Home Visits, 2nd Follow-Up Period***	31.7	3.6	28.2***	36.0	2.1	33.9***
Weekly Home Visits, 3rd Follow-Up Period***	26.1	3.5	22.6***	28.7	2.4	26.3***
Weekly Home Visits in At Least 1 Followup***	55.1	8.4	46.7***	56.9	4.3	52.6***
Weekly Home Visits in All 3 Followups***	15.7	0.2	15.4***	19.4	0.7	18.8***
Child Care						
Any Child Care***	94.1	88.9	5.3**	82.1	75.8	6.3**
Any Center-Based Child Care***	52.3	37.6	14.7***	49.5	33.4	16.2***
Average Hours Per Week of Center-Based Care	4.7	3.0	1.8**	6.4	3.0	3.4***
Concurrent Child Care Arrangements***	58.2	56.1	2.1	47.8	41.0	6.8**
Average Weekly Out-of-Pocket Cost of Care	$3.33	$5.60	-$2.27**	$5.10	$7.60	-$2.51**
Received a Child Care Subsidy***	39.6	43.4	-3.8	24.9	26.5	-1.7
Child Was in Care at 12 Months of Age***	75.0	61.4	13.6***	60.4	54.3	6.2*
Child Was in Care at 24 Months of Age***	73.4	61.9	11.8***	58.3	52.0	6.3*
Case Management						
Any Case Management Meetings***	84.0	62.5	21.6***	87.9	54.2	33.8***
Weekly Case Management, 1st Follow-Up Period***	45.0	10.0	35.0***	47.5	8.4	39.1***
Weekly Case Management, 2nd Follow-Up Period***	32.5	5.5	27.0***	35.1	5.2	29.9***
Weekly Case Management, 3rd Follow-Up Period***	26.6	4.9	21.7***	28.7	5.0	23.6***
Group Activities						
Any Group Parenting Activities***	65.3	38.4	27.0***	72.0	35.6	36.3***
Any Parent-Child Group Activities**	33.3	13.4	20.0***	44.3	15.9	28.4***

411

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TABLE VII.7 (*continued*)

	Teenage Mother (19 and Younger)			Older Mother (20 and Older)		
	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant
Early Intervention Services						
Identification of Child's Disability***	3.6	3.3	0.3	9.5	6.4	3.0*
Services for Child With Disability***	1.5	2.3	-0.9	6.5	3.8	2.7**
Child Health Services						
Any Child Health Services***	100.0	99.8	0.3	100.0	99.9	0.1
Any Doctor Visits***	99.5	98.7	0.8	98.6	98.9	-0.3
Any Emergency Room Visits***	60.9	56.0	4.9	52.2	53.0	-0.7
Number of Emergency Room Visits for Injuries	0.3	0.2	0.1	0.2	0.3	-0.1**
Any Dentist Visits***	26.0	23.8	2.2	29.5	28.5	0.9
Any Screening Tests***	65.8	68.7	-2.9	65.3	65.7	-0.4
Any Immunizations***	98.6	98.0	0.6	99.2	97.7	1.5*
Family Development Services						
Any Education-Related Services***	90.8	73.9	17.0***	83.4	49.1	34.2***
Any Employment-Related Services***	77.4	55.4	22.0***	75.9	44.4	31.5***
Any Family Health Services[c]	100.0	100.0	0.0	100.0	100.0	0.0
Any Family Mental Health Services***	21.1	19.4	1.7	24.5	21.4	3.1
Transportation Assistance***	36.6	29.6	7.0*	28.8	20.3	8.5***
Housing Assistance***	59.3	59.4	-0.2	59.3	56.7	2.7
Sample Size	**406**	**382**	**788**	**642**	**601**	**1,241**

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroups are included in the estimates for each subgroup.

[a] Home visits, case management, center-based child care, and/or group parenting activities.

[b] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups in the first two columns.

[c] There is no variance across subgroups due to lack of variance in level of services.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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TABLE VII.8

IMPACTS ON CHILD AND FAMILY OUTCOMES AT AGE 3, BY AGE OF MOTHER AT BIRTH OF FOCUS CHILD

	Teenage Mother (19 and Younger)				Older Mother (20 and Older)			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Child Cognitive And Language Development								
Bayley Mental Development Index (MDI) Standard Score	91.5	89.2	2.4**	18.4	92.1	90.7	1.4	10.5
Percentage with MDI < 85***[d]	25.5	35.1	-9.6**	-20.6	25.4	28.1	-2.7	-5.8
Peabody Picture Vocabulary Test (PPVT)-III Standard Score	81.7	81.1	0.6	3.9	85.4	82.9	2.5*	15.0
Percentage with PPVT-III < 85***	58.4	57.8	0.5	1.1	44.7	51.8	-7.1*	-14.3
Child Social-Emotional Development								
Engagement of Parent During Parent-Child Semistructured Play	4.9	4.6	0.3***	29.1	4.8	4.6	0.2**	14.6
Sustained Attention with Objects During Parent-Child Semistructured Play*	5.1	4.8	0.3***	30.0	5.0	4.9	0.1	7.7
Engagement of Parent During Parent-Child Puzzle Challenge Task	5.0	4.9	0.1	10.2	5.0	4.9	0.1	6.3
Persistence During Parent-Child Puzzle Challenge Task	4.6	4.5	0.1	10.6	4.6	4.5	0.1	6.6
Bayley Behavioral Rating Scale (BRS): Emotional Regulation	3.9	3.9	0.0	0.6	4.0	4.0	0.0	3.3
Bayley BRS: Orientation/ Engagement	3.9	3.9	-0.0	-0.6	3.8	3.8	0.0	1.1
Negativity Toward Parent During Parent-Child Semistructured Play	1.2	1.3	-0.1	-11.7	1.2	1.3	-0.1**	-14.9
Frustration During Parent-Child Puzzle Challenge Task	2.7	2.7	-0.0	-3.0	2.7	2.8	-0.1	-4.2
Child Behavior Checklist—Aggressive Behavior	10.6	11.2	-0.6	-9.2	10.8	11.6	-0.8*	-12.4
Child Health Status								
Child's Health Status*	4.1	4.0	0.1	10.6	4.0	4.1	-0.1	-9.7
Percentage of Children in Fair or Poor Health***	4.5	9.1	-4.6**	-16.2	9.5	8.7	0.8	2.7
Quality Of The Home Environment And Parenting: Overall And Physical Environment								
Home Observation for Measurement of the Environment (HOME) Total Score	26.5	26.6	-0.1	-2.6	28.0	27.5	0.2*	10.1
HOME Internal Physical Environment	7.6	7.8	-0.2	-12.2	7.9	7.9	0.1	4.4
Parenting Behavior: Emotional Support								
HOME Warmth	2.5	2.4	0.1	7.4	2.6	2.6	0.1	7.3
Supportiveness During Parent-Child Semistructured Play	3.9	3.7	0.2**	23.2	4.1	4.0	0.1*	12.0
Supportive Presence During Parent-Child Puzzle Challenge Task	4.3	4.3	0.0	0.8	4.7	4.5	0.1	10.2
Parenting Behavior: Stimulation Of Language And Learning								
Percentage of Children with a Regular Bedtime***	52.0	55.5	-3.5	-7.1	64.1	61.5	2.6	5.3
Percentage of Children Who Follow a Bedtime Routine***	67.3	65.1	2.2	4.8	71.3	71.9	-0.7	1.5

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413

TABLE VII.8 *(continued)*

	Teenage Mother (19 and Younger)				Older Mother (20 and Older)			
Outcome	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c
HOME: Support of Language and Learning	10.4	10.4	-0.0	-1.0	10.8	10.6	0.2*	10.9
Parent-Child Play	4.5	4.4	0.1	7.5	4.4	4.3	0.1	6.4
Quality of Assistance During Parent-Child Puzzle Challenge Task	3.5	3.4	0.1	8.3	3.7	3.5	0.2*	12.8
Percentage of Parents Who Read to Child Daily***	56.2	55.8	0.3	0.7	56.6	51.1	5.5*	11.0
Percentage of Parents Who Read to Child at Bedtime***	28.4	27.8	0.6	1.2	35.8	29.2	6.7**	14.7
Parenting Behavior: Negative Parenting Behavior								
Detachment During Parent-Child Semistructured Play	1.3	1.4	-0.0	-7.2	1.2	1.2	-0.0	-5.3
Intrusiveness During Parent-Child Semistructured Play	1.6	1.7	-0.1	-14.2	1.5	1.5	0.0	1.4
Detachment During Parent-Child Puzzle Challenge Task	1.8	1.7	0.0	1.1	1.6	1.6	-0.1	-5.4
Intrusiveness During Parent-Child Puzzle Challenge Task	2.7	2.8	-0.1	-9.9	2.6	2.7	-0.1	-4.9
Negative Regard During Parent-Child Semistructured Play	1.3	1.4	-0.0	-6.9	1.3	1.2	0.0	1.8
HOME Harshness	0.4	0.4	0.0	7.2	0.3	0.3	0.0	0.5
Percentage of Parents Who Spanked Child in the Past Week***	53.0	61.0	-7.6*	-15.2	43.2	51.4	-8.3**	-16.6
Knowledge Of Safety Practices and Discipline Strategies								
Percentage of Parents Who Usually Use a Car Seat Correctly***	62.4	66.8	-4.4	-9.6	73.8	71.7	2.0	4.4
Percentage of Parents Suggesting Physical Punishment as a Discipline Strategy***	51.1	56.7	-5.6	-11.2	41.1	47.8	-6.7**	-13.5
Percentage of Parents Who Would Use Mild Discipline Only***	43.1	37.2	5.9	12.0	48.5	43.4	5.1	10.3
Index of Severity of Discipline Strategies	3.5	3.7	-0.2	-12.0	3.2	3.4	-0.2**	-13.9
Parent Physical And Mental Health								
Parent's Health Status**	3.5	3.4	0.1	7.5	3.4	3.5	-0.2**	-17.1
Parenting Stress Index (PSI) Parental Distress	24.7	25.6	-0.8	-8.7	24.8	25.3	-0.5	-5.0
PSI Parent-Child Dysfunctional Interaction	17.7	18.0	-0.3	-5.0	17.7	17.6	0.1	2.0
Center for Epidemiological Studies Depression (CES-D; Short Form)	7.7	8.1	-0.5	-6.5	7.3	7.6	-0.3	-3.8
CES-D Severe Depressive Symptoms ***	14.8	13.8	1.1	3.0	14.7	15.9	-1.3	-3.5
Family Environment Scale (FES): Family Conflict	1.6	1.6	-0.0	-6.3	1.7	1.7	-0.0	3.7
Father Presence								
Currently Married To Biological Father ***	21.5	17.0	4.6	9.4	42.0	45.9	-3.9	-8.0
Biological Father is Currently Married to, Lives with, or is Boyfriend of Respondent***	40.5	39.0	1.5	3.0	53.4	57.2	-3.8	-7.6
Biological Father Currently Present in Child's Life***	64.1	68.3	-4.2	-9.5	76.4	74.1	2.3	5.2

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TABLE VII.8 (*continued*)

	Teenage Mother (19 and Younger)				Older Mother (20 and Older)			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Continuous Biological Father Presence Child Age 14-36 Months***	56.0	63.7	-7.7	-16.7	73.0	71.7	1.3	2.8
No Biological Father Presence Child Age 14-36 Months***	14.0	12.8	1.2	3.7	10.8	10.8	-0.0	-0.1
Continuous Male Presence Child Age 14-36 Months***	77.4	84.8	-7.4*	-20.7	80.5	84.8	-4.2	-11.8
No Male Presence Child Age 14-36 Months***	2.6	0.3	2.3*	19.0	2.5	1.4	1.1	9.0
Sample Size								
Bayley	**329**	**311**	**640**		**520**	**447**	**967**	
Parent Interview	**408**	**378**	**786**		**668**	**600**	**1,268**	
Parent-Child Interactions	**321**	**308**	**629**		**526**	**456**	**982**	

SOURCE: Parent interviews, child assessments, interviewer observations, and assessments of semistructured parent-child interactions conducted when children were approximately 36 months old.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE VII.9

IMPACTS ON SELF-SUFFICIENCY AT 28 MONTHS, BY AGE OF MOTHER AT BIRTH OF FOCUS CHILD

	Teenage Mother (19 and Younger)				Older Mother (20 and Older)			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Education/Job Training								
Ever in Education or Training***[d]	77.9	70.3	7.6**	15.2	49.7	40.0	9.7***	19.4
Ever in High School***	33.4	25.2	8.3**	29.1	0.8	0.4	0.4	1.4
Ever in ESL Class***	0.0	0.0	0.0	0.0	4.8	3.7	1.1	7.5
Ever in Vocational Program***	24.4	23.8	0.5	1.4	16.9	12.6	4.3*	11.3
Average Hours per Week in Education or Training	8.6	6.4	2.3***	35.5	2.3	1.8	0.5*	7.8
In Education or Training:								
1st Quarter***	36.8	32.8	4.1	9.8	13.3	15.5	-2.2	-5.2
2nd Quarter***	42.5	37.2	5.3	12.4	17.5	17.3	0.2	0.5
3rd Quarter***	48.7	40.4	8.3**	18.8	20.8	18.2	2.6	6.0
4th Quarter***	45.7	36.6	9.1**	21.1	22.0	17.7	4.3*	9.9
5th Quarter***	44.5	39.1	5.4	12.5	22.5	17.2	5.3**	12.4
6th Quarter***	45.6	38.0	7.6*	18.4	21.4	14.2	7.1***	17.2
7th Quarter***	38.5	35.0	3.4	8.6	18.0	13.6	4.4*	11.0
8th Quarter***	37.6	31.6	6.0	15.3	19.7	12.5	7.2***	18.4
Have High School Diploma***	40.7	39.4	1.3	2.6	57.3	56.2	1.1	2.2
Have GED***	14.8	14.7	0.0	0.1	8.8	9.9	-1.1	-3.4
Employment								
Ever Employed***	88.5	90.7	-2.2	-5.8	86.5	79.9	6.7***	17.8
Average Hours/Week Employed	15.4	15.8	-0.4	-3.0	18.4	17.6	0.8	5.2
Employed in:								
1st Quarter***	30.8	37.8	-7.1*	-14.6	44.4	39.7	4.6*	9.5
2nd Quarter***	41.3	44.5	-3.2	-6.4	49.1	46.5	2.6	5.2
3rd Quarter***	50.1	55.0	-4.9	-9.9	56.1	51.9	4.2	8.4
4th Quarter***	58.2	55.4	2.7	5.5	58.0	56.7	1.3	2.5
5th Quarter***	62.9	62.8	0.2	0.3	63.3	59.8	3.5	7.0
6th Quarter***	66.2	63.2	3.1	6.2	65.3	58.0	7.3**	14.8
7th Quarter***	60.5	58.4	2.1	4.2	60.5	55.7	4.8	9.7
8th Quarter***	64.0	62.6	1.3	2.7	63.5	59.2	4.3	8.9
Any Self-Sufficiency-Oriented Activity (Education, Training or Employment)								
Ever Employed or in Education/Training***	97.8	96.2	1.6	5.3	91.8	87.6	4.2**	13.9
Average Hours per Week in Any Activity	25.6	22.6	3.0**	19.2	20.9	19.9	1.0	6.4
In Activities in:								
1st Quarter***	56.5	58.3	-1.8	-3.5	51.2	48.3	3.0	6.0
2nd Quarter***	66.9	65.7	1.2	2.4	59.3	54.7	4.6*	9.3
3rd Quarter***	76.0	73.4	2.6	5.4	67.5	62.1	5.4**	11.3
4th Quarter***	80.9	70.7	10.2***	21.4	68.6	64.4	4.2	8.7
5th Quarter***	83.4	77.4	6.1*	13.2	70.7	67.4	3.3	7.2
6th Quarter***	85.7	77.8	7.9**	16.8	73.5	63.6	9.9***	21.1
7th Quarter***	78.2	72.0	6.2	13.0	67.2	62.3	4.9	10.3
8th Quarter***	80.8	73.6	7.2*	15.4	69.8	65.1	4.7	10.0

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TABLE VII.9 (*continued*)

	Teenage Mother (19 and Younger)					Older Mother (20 and Older)			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]		Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
AFDC/TANF Receipt									
Ever Received AFDC/TANF***	54.0	50.9	3.1	6.2		43.2	41.5	1.7	3.4
Received AFDC/TANF in:									
1st Quarter***	35.7	29.6	6.1*	13.1		32.0	32.0	0.0	0.0
2nd Quarter***	39.8	33.7	6.1*	12.7		32.2	33.0	-0.8	-1.7
3rd Quarter***	42.6	37.0	5.6	11.7		34.5	33.8	0.7	1.4
4th Quarter***	34.3	31.8	2.5	5.4		28.6	29.5	-0.9	-2.0
5th Quarter***	33.6	32.5	1.1	2.4		28.3	28.4	-0.1	-0.2
6th Quarter***	33.5	34.7	-1.2	-2.6		26.7	27.9	-1.2	-2.7
7th Quarter***	25.8	34.0	-8.2**	-18.7		19.5	22.3	-2.8	-6.3
8th Quarter***	25.1	33.5	-8.5**	-19.9		20.2	18.2	2.0	4.8
Total AFDC/TANF Benefits ($)*	$1,912	$2,509	-$597**	-15.5		$2,284	$2,158	$126	3.3
Receipt of Other Welfare Benefits									
Ever Received Welfare***	70.9	71.2	-0.3	-0.6		66.8	63.0	3.8*	8.2
Total Welfare Benefits ($)*	$5,451	$6,760	-$1,309*	-17.3		$5,644	$5,680	-$36	-0.5
Ever Received Food Stamps***	62.4	61.9	0.4	0.9		60.4	57.8	2.6	5.3
Total Food Stamp Benefits ($)	$2,030	$2,058	-$28	-1.0		$2,224	$2,197	$28	1.0
Income/Poverty									
Income Above Poverty Level***	37.3	38.9	-1.6	-3.2		46.2	45.6	0.7	1.4
Subsequent Births									
Subsequent Birth by 24 Months after Random Assignment***	26.4	33.1	-6.7	-14.9		21.1	25.3	-4.2	-9.4
Sample Size	**406**	**382**	**788**			**642**	**601**	**1,241**	

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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TABLE VII.10

IMPACTS ON SERVICE RECEIPT DURING THE FIRST 28 MONTHS, BY RACE/ETHNICITY

	African American			Hispanic			White, Non-Hispanic		
	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant
Any Services									
Any Key Services***a,b	94.2	82.5	11.7***	97.4	65.6	31.9***	96.0	79.7	16.3***
Any Home Visits Or Center-Based Child Care***	90.8	59.9	30.8***	95.4	40.0	55.4***	94.4	58.1	36.3***
More Than 1 Home Visit or 2 Weeks Center-Based Child Care***	89.5	54.6	35.0***	94.5	30.4	64.1***	94.5	58.7	35.8***
Home Visits or Center Care at Required Intensity in at Least 1 Followup***	65.9	13.8	52.1***	74.8	6.8	68.0***	88.1	15.0	73.2***
Home Visits or Center Care at Required Intensity in All 3 Followups***	19.9	5.9	14.0***	26.1	0.3	25.8***	38.9	2.1	36.8***
Home Visits									
Any Home Visits***	82.6	37.4	45.2***	90.7	24.5	66.2***	91.9	35.7	56.1***
Any Child Development Services During Home Visits***	82.3	34.8	47.5***	90.5	21.9	68.6***	90.9	32.3	58.6***
Weekly Home Visits, 1st Follow-Up Period***	41.3	4.0	37.3***	29.9	-1.4	35.7***	64.7	5.0	59.8***
Weekly Home Visits, 2nd Follow-Up Period***	26.7	1.0	25.7***	36.0	1.1	34.9***	47.9	3.9	44.0***
Weekly Home Visits, 3rd Follow-Up Period***	20.6	1.4	19.2***	32.8	1.7	31.1***	34.0	2.7	31.3***
Weekly Home Visits in At Least 1 Followup***	47.2	4.1	43.1***	48.1	2.1	53.2***	72.3	8.5	63.8***
Weekly Home Visits in All 3 Followups***	6.9	0.1	6.9***	12.9	0.0	17.4***	27.1	0.7	26.4***
Child Care									
Any Child Care***	92.4	83.7	8.7***	82.3	62.2	20.1***	85.9	82.8	3.1
Any Center-Based Child Care***	54.8	40.5	14.3***	45.0	18.9	26.2***	45.8	32.9	12.9***
Average Hours Per Week of Center-Based Care	6.4	3.2	3.2***	6.3	2.2	4.2***	4.5	2.0	2.5***
Concurrent Child Care Arrangements***	58.7	44.3	14.4***	47.1	31.2	15.9***	48.5	51.0	-2.5
Average Weekly Out-of-Pocket Cost of Care	$4.13	$6.59	-$2.46*	$3.05	$8.27	-$5.22***	$6.42	$7.63	-$1.21
Received a Child Care Subsidy***	40.1	39.9	0.2	20.4	23.8	-4.7	35.2	35.5	-0.3
Child Was in Care at 12 Months of Age***	77.3	57.8	19.5***	57.7	48.0	9.7	64.9	55.7	9.2**
Child Was in Care at 24 Months of Age***	75.0	58.9	16.1***	59.3	44.4	14.9***	57.9	55.6	2.3
Case Management									
Any Case Management Meetings***	84.9	55.5	29.3***	86.3	31.3	55.0***	94.1	59.8	34.4***
Weekly Case Management, 1st Follow-Up Period***	40.3	11.1	29.2***	35.9	4.3	31.6***	65.6	8.6	57.0***
Weekly Case Management, 2nd Follow-Up Period***	26.7	5.9	20.8***	27.5	1.5	26.0***	48.1	5.9	42.1***
Weekly Case Management, 3rd Follow-Up Period***	20.9	2.6	18.3***	29.1	3.4	25.7***	37.7	7.3	30.4***

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TABLE VII.10 (*continued*)

	African American			Hispanic			White, Non-Hispanic		
	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant
Group Activities									
Any Group Parenting Activities***	62.6	31.4	31.2***	73.3	30.1	43.3***	70.2	39.6	30.6***
Any Parent-Child Group Activities***	33.7	11.2	22.5***	46.3	8.4	37.8***	44.4	18.7	25.7***
Early Intervention Services									
Identification of Child's Disability***	8.3	4.8	3.5*	4.2	1.7	2.6	11.3	7.1	4.2
Services for Child With Disability***	6.0	2.8	3.2**	1.2	0.4	0.8	7.3	5.6	1.7
Child Health Services									
Any Child Health Services***	100.0	99.7	0.3	100.0	100.0	0.0	100.0	99.8	0.3
Any Doctor Visits***	99.4	97.6	1.7	98.5	97.2	1.2	99.2	99.7	-0.6
Any Emergency Room Visits***	52.5	52.3	0.2	46.8	47.4	-0.6	62.5	56.3	6.2
Number of Emergency Room Visits for Injuries	0.2	0.2	0.0	0.1	0.1	-0.0	0.4	0.5	-0.1
Any Dentist Visits***	31.3	29.2	2.1	29.4	27.0	2.4	21.9	19.8	2.2
Any Screening Tests***	74.5	73.9	0.7	56.8	54.9	1.9	66.3	70.7	-4.5
Any Immunizations***	98.1	98.5	-0.4	99.3	99.1	0.3	99.4	98.1	1.3
Family Development Services									
Any Education-Related Services***	89.5	65.9	23.6***	86.3	41.7	44.7***	89.2	53.9	35.3***
Any Employment-Related Services***	76.1	56.5	19.6***	77.1	15.9	61.2***	79.5	49.1	30.4***
Any Family Health Services[c]	100.0	100.0	0.0	100.0	100.0	0.0	100.0	100.0	0.0
Any Family Mental Health Services***	17.3	13.5	3.8	12.7	8.8	4.0	34.3	30.7	3.6
Transportation Assistance***	37.8	29.6	8.3**	31.4	8.8	22.6***	33.1	21.8	11.3***
Housing Assistance***	67.9	71.8	-3.8	46.9	32.0	14.8**	59.0	55.8	3.2
Sample Size	**373**	**336**	**709**	**250**	**225**	**475**	**393**	**376**	**769**

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroups are included in the estimates for each subgroup.

[a] Home visits, case management, center-based child care, and/or group parenting activities.

[b] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

[c] There is no variance across subgroups due to lack of variance in level of services.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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TABLE VII.11

IMPACTS ON CHILD AND FAMILY OUTCOMES AT AGE 3, BY RACE/ETHNICITY

	African American				Hispanic				White, Non-Hispanic			
Outcome	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c
Child Cognitive and Language Development												
Bayley Mental Development Index (MDI) Standard Score	88.5	86.9	1.6	12.7	92.0	91.3	0.7	5.4	94.8	93.3	1.5	11.5
Percentage with MDI < 85***^{d}	36.0	37.5	-1.4	-3.1	20.3	28.1	-7.8	-16.7	21.1	23.2	-2.1	-4.5
Peabody Picture Vocabulary Test (PPVT)-III Standard Score	82.6	78.8	3.8**	23.2	77.4	71.2	6.2	38.1	87.7	86.9	0.8	4.7
Percentage with PPVT-III < 85***	55.9	64.2	-8.3	-16.7	64.2	66.8	-2.6	-5.2	37.0	42.5	-5.5	-11.1
Child Social-Emotional Development												
Engagement of Parent During Parent-Child Semistructured Play***	4.8	4.3	0.5***	47.8	4.7	4.7	-0.0	-1.4	4.9	4.8	0.1	8.8
Sustained Attention with Objects During Parent-Child Semistructured Play***	5.1	4.6	0.5***	48.0	4.8	4.8	-0.0	-4.4	5.1	5.0	0.2	16.1
Engagement of Parent During Parent-Child Puzzle Challenge Task***	5.1	4.6	0.5***	49.1	5.0	5.0	-0.0	-1.4	5.1	5.0	0.1	5.7
Persistence During Parent-Child Puzzle Challenge Task	4.5	4.2	0.3**	28.8	4.5	4.5	0.0	0.2	4.8	4.8	-0.0	-1.8
Bayley Behavioral Rating Scale (BRS): Emotional Regulation	4.0	4.0	0.0	3.8	3.9	3.8	0.1	12.2	3.9	4.0	-0.1	-13.5
Bayley BRS: Orientation/ Engagement	3.9	3.8	0.1	10.7	3.7	3.5	0.2**	27.2	4.0	4.0	-0.0	-3.5
Negativity Toward Parent During Parent-Child Semistructured Play**	1.2	1.4	-0.2***	-36.8	1.2	1.3	-0.1	-8.3	1.3	1.3	0.0	2.7

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TABLE VII.11 (*continued*)

	African American				Hispanic				White, Non-Hispanic			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Frustration During Parent-Child Puzzle Challenge Task	2.5	2.6	-0.1	-6.1	2.8	2.6	0.2	11.0	3.0	2.9	0.1	6.1
Child Behavior Checklist—Aggressive Behavior**	9.1	11.4	-2.2***	-34.9	11.7	10.4	1.2	19.3	11.9	12.3	-0.4	-6.7
Child Health Status												
Child's Health Status	4.1	4.1	-0.0	-3.5	4.0	3.9	0.1	10.3	4.1	4.0	0.0	4.2
Percentage of Children in Fair or Poor Health***	7.7	7.5	0.2	0.7	8.5	12.3	-3.8	-13.5	7.1	8.7	-1.6	-5.6
Quality of the Home Environment and Parenting: Overall and Physical Environment												
Home Observation for Measurement of the Environment (HOME) Total Score*	27.1	25.8	1.3***	26.5	27.1	27.0	0.1	2.0	28.4	28.5	-0.1	-1.4
HOME Internal Physical Environment	7.7	7.6	0.1	5.6	8.0	8.0	-0.0	-0.5	7.7	7.9	-0.2	-12.8
Parenting Behavior: Emotional Support												
HOME Warmth*	2.5	2.3	0.2**	24.7	2.5	2.6	-0.1	-10.3	2.6	2.6	0.0	4.3
Supportiveness During Parent-Child Semistructured Play**	4.0	3.6	0.4***	47.3	3.8	3.8	0.0	4.3	4.1	4.1	0.1	7.7
Supportive Presence During Parent-Child Puzzle Challenge Task	4.3	3.9	0.4**	29.8	4.2	4.1	0.2	11.5	4.9	4.9	-0.0	-0.6
Parenting Behavior: Stimulation of Language and Learning												
Percentage of Children with a Regular Bedtime***	60.0	48.5	11.5**	23.2	49.3	60.9	-11.6*	-23.6	62.8	68.1	-5.3	-10.8
Percentage of Children Who Follow a Bedtime Routine***	65.2	62.9	2.3	4.9	66.5	62.9	3.6	7.8	77.5	73.1	4.4	9.6
HOME: Support of Language and Learning*	10.6	10.1	0.5**	22.9	10.3	9.8	0.5*	21.2	11.1	11.2	-0.1	-4.1
Parent-Child Play	4.4	4.3	0.1	8.9	4.2	4.1	0.1	12.7	4.5	4.5	-0.0	-1.7

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TABLE VII.11 (*continued*)

	African American				Hispanic				White, Non-Hispanic			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Quality of Assistance During Parent-Child Puzzle Challenge Task	3.4	3.1	0.3**	27.4	3.5	3.2	0.3*	21.7	3.9	3.8	0.1	5.3
Percentage of Parents Who Read to Child Daily***	54.5	49.7	4.7	9.5	45.1	30.9	14.2**	28.5	66.6	62.7	3.9	7.9
Percentage of Parents Who Read to Child at Bedtime***	34.1	25.7	8.4*	18.4	23.3	17.2	6.1	13.4	40.6	40.1	0.5	1.1
Parenting Behavior: Negative Parenting Behavior												
Detachment During Parent-Child Semistructured Play	1.3	1.4	-0.1	-17.8	1.2	1.3	-0.0	-4.9	1.2	1.2	0.0	4.7
Intrusiveness During Parent-Child Semistructured Play	1.7	1.9	-0.2*	-23.2	1.6	1.5	0.0	3.6	1.5	1.4	0.0	2.5
Detachment During Parent-Child Puzzle Challenge Task	1.8	1.9	-0.1	-13.1	1.7	1.6	0.1	9.0	1.6	1.6	0.0	1.3
Intrusiveness During Parent-Child Puzzle Challenge Task	2.9	3.2	-0.3*	-24.0	2.8	2.8	-0.0	-2.1	2.4	2.4	0.0	0.9
Negative Regard During Parent-Child Semistructured Play	1.4	1.5	-0.1	-23.1	1.1	1.2	-0.1	-11.0	1.3	1.3	0.1	9.2
HOME Harshness	0.3	0.4	-0.1	-10.9	0.3	0.2	0.1	15.6	0.3	0.3	0.1	14.2
Percentage of Parents Who Spanked Child in the Past Week***	60.7	65.5	-4.8	-9.7	42.5	43.9	-1.4	-2.7	43.6	49.8	-6.3	-12.6
Knowledge of Safety Practices and Discipline Strategies												
Percentage of Parents Who Usually Use a Car Seat Correctly***	62.1	63.2	-1.1	-2.4	72.1	70.4	1.7	3.8	76.1	75.1	1.0	2.1
Percentage of Parents Suggesting Physical Punishment as a Discipline Strategy***	73.0	80.5	-7.5*	-15.0	39.1	43.1	-4.0	-8.0	30.6	38.4	-7.8*	-15.6
Percentage of Parents Who Would Use Mild Discipline Only***	21.6	16.7	4.9	9.9	49.1	37.7	11.4	23.1	58.5	55.2	3.3	6.7

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TABLE VII.11 (*continued*)

	African American				Hispanic				White, Non-Hispanic			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Index of Severity of Discipline Strategies	4.1	4.4	-0.3**	-18.4	3.2	3.5	-0.3	-19.1	2.9	3.1	-0.2	-11.8
Parent Physical and Mental Health												
Parent's Health Status	3.6	3.5	0.0	4.2	3.2	3.4	-0.2	-18.0	3.4	3.5	-0.1	-12.4
Parenting Stress Index (PSI) Parental Distress	24.3	26.2	-1.9*	-19.7	25.4	24.7	0.7	7.4	25.3	24.6	0.7	7.4
PSI Parent-Child Dysfunctional Interaction***	16.7	18.0	-1.4*	-22.5	18.5	18.4	0.1	1.9	18.5	17.1	1.4**	22.3
Center for Epidemiological Studies Depression (CES-D; Short Form)	7.5	8.1	-0.5	-7.3	6.1	5.4	0.7	10.1	8.6	8.9	-0.3	-4.6
CES-D Severe Depressive Symptoms ***	13.8	16.8	-3.0	-8.4	10.6	6.9	3.7	10.3	18.0	20.6	-2.6	-7.2
Family Environment Scale (FES): Family Conflict	1.6	1.7	-0.0	-7.2	1.7	1.7	-0.0	-0.3	1.7	1.7	-0.0	-2.8
Father Presence												
Currently Married To Biological Father ***	15.9	21.0	-5.1	-10.6	57.8	59.2	-1.4	-2.9	44.3	41.3	3.0	6.2
Biological Father is Currently Married to, Lives with, or is Boyfriend of Respondent***	33.0	37.8	-4.9	-9.8	68.9	72.4	-3.5	-7.1	54.3	53.5	0.8	1.6
Biological Father Currently Present in Child's Life***	72.1	67.4	4.7	10.5	83.5	83.1	0.3	0.8	70.5	71.4	-0.9	-2.0
Continuous Biological Father Presence Child Age 14-36 Months***	58.4	56.8	1.6	3.4	84.2	87.5	-3.3	-7.2	66.2	71.1	-4.9	-10.6
No Biological Father Presence Child Age 14-36 Months***	12.1	17.6	-5.4	-17.3	6.0	5.2	0.8	2.6	12.7	10.1	2.7	8.4
Continuous Male Presence Child Age 14-36 Months***	76.5	77.1	-0.6	-1.7	91.3	91.0	0.3	0.9	79.6	89.8	-10.2***	-28.6

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423

TABLE VII.11 (*continued*)

	African American				Hispanic				White, Non-Hispanic			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
No Male Presence Child Age 14-36 Months***	3.5	2.0	1.5	12.4	1.1	1.5	-0.4	-3.3	1.3	0.6	0.7	5.9
Sample Size												
Bayley	287	241	528		220	177	397		326	307	633	
Parent Interview	354	332	686		259	211	470		431	390	821	
Parent-Child Interactions	271	243	514		224	181	405		334	305	639	

SOURCE: Parent interviews, child assessments, interviewer observations, and assessments of semistructured parent-child interactions conducted when children were approximately 36 months old.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE VII.12

IMPACTS ON SELF-SUFFICIENCY AT 28 MONTHS, BY RACE/ETHNICITY

	African American				Hispanic				White, Non-Hispanic			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Education/Job Training												
Ever in Education or Training***[d]	64.0	59.9	4.1	8.2	49.0	34.0	15.0**	30.0	58.4	48.5	9.8**	19.6
Ever in High School***	17.8	16.1	1.7	6.1	7.2	4.5	2.7	9.5	7.9	5.8	2.2	7.6
Ever in ESL Class***	0.7	0.2	0.5	3.5	10.9	8.0	2.9	20.4	0.6	0.7	-0.1	-0.8
Ever in Vocational Program***	25.5	20.7	4.8	12.8	15.4	8.0	7.5*	19.8	20.2	20.4	-0.2	-0.6
Average Hours per Week in Education or Training	6.5	4.7	1.8**	28.4	3.4	1.5	1.9***	29.7	3.5	2.7	0.7	11.7
In Education or Training:												
1st Quarter***	26.8	27.8	-1.0	-2.5	14.2	18.6	-4.4	-10.6	20.5	20.9	-0.4	-0.9
2nd Quarter***	32.0	29.5	2.4	5.6	21.8	23.2	-1.4	-3.2	22.3	22.9	-0.6	-1.4
3rd Quarter***	37.6	33.1	4.5	10.1	32.3	20.7	11.6**	26.4	22.5	25.1	-2.5	-5.8
4th Quarter***	37.1	32.8	4.4	10.2	32.4	15.7	16.7***	39.0	25.9	22.9	3.0	7.1
5th Quarter***	37.8	34.3	3.5	8.2	30.8	16.8	14.0***	32.5	25.8	21.4	4.4	10.1
6th Quarter***	34.7	31.8	2.8	6.8	19.6	17.1	2.5	6.1	24.1	15.5	8.6**	20.7
7th Quarter***	33.3	25.0	8.3*	20.7	20.9	17.9	3.0	7.6	19.7	13.8	6.0	14.9
8th Quarter***	35.2	24.8	10.4**	26.4	22.2	17.2	5.0	12.8	21.2	12.3	8.9**	22.6
Have High School Diploma***	53.5	51.2	2.3	4.6	26.7	30.3	-3.6	-7.2	61.7	55.0	6.8	13.5
Have GED***	10.0	11.8	-1.8	-5.6	9.0	5.8	3.2	10.2	13.9	16.5	-2.6	-8.2
Employment												
Ever Employed***	88.6	78.2	10.4***	27.6	86.0	80.3	5.7	15.1	87.8	87.5	0.2	0.6
Average Hours/Week Employed	17.6	15.7	1.9	12.9	17.1	16.0	1.1	7.6	16.9	17.0	-0.1	-0.7
Employed in:												
1st Quarter***	35.0	36.9	-1.9	-3.9	35.2	38.2	-3.0	-6.1	45.1	41.9	3.2	6.6
2nd Quarter***	42.1	42.2	-0.3	-0.6	44.1	51.6	-7.5	-15.1	52.4	46.1	6.4	12.8
3rd Quarter***	51.4	47.2	4.2	8.4	46.5	58.9	-12.4**	-24.8	60.0	53.1	6.9	13.9
4th Quarter***	51.5	49.9	1.5	3.0	50.4	57.5	-7.0	-14.1	59.1	55.6	3.5	7.0
5th Quarter***	53.1	58.4	-5.3	-10.8	60.8	59.5	1.3	2.7	65.8	62.2	3.6	7.3
6th Quarter***	60.8	56.0	4.8	9.7	61.9	53.6	8.3	16.8	70.5	63.8	6.7	13.6
7th Quarter***	55.8	52.8	2.9	5.9	61.0	55.4	5.7	11.5	63.3	60.9	2.4	4.8
8th Quarter***	60.8	58.1	2.7	5.5	63.1	51.9	11.2*	22.9	67.1	65.4	1.7	3.6
Any Self-Sufficiency-Oriented Activity (Education, Training, or Employment)												
Ever Employed or in Education/Training***	96.0	86.8	9.2***	30.4	91.8	85.5	6.3	20.8	94.6	91.1	3.5	11.5
Average Hours per Week in Any Activity	24.2	21.5	2.8*	17.5	21.3	17.5	3.8**	24.2	20.5	20.5	-0.0	-0.2

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TABLE VII.12 (*continued*)

	African American				Hispanic				White, Non-Hispanic			
Outcome	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c
In Activities in:												
1st Quarter***	55.1	54.3	0.8	1.6	45.0	48.6	-3.5	-7.1	56.4	54.2	2.2	4.4
2nd Quarter***	64.1	58.4	5.7	11.5	57.0	62.8	-5.7	-11.6	63.6	57.9	5.7	11.6
3rd Quarter***	75.9	64.8	11.1**	23.3	63.7	63.4	0.4	0.8	70.9	66.2	4.7	9.9
4th Quarter***	74.1	64.4	9.7**	20.3	70.8	61.3	9.5*	19.9	69.3	65.9	3.4	7.2
5th Quarter***	75.9	70.5	5.4	11.7	72.0	63.3	8.7	18.8	73.9	72.1	1.8	3.9
6th Quarter***	79.0	68.8	10.2**	21.7	68.3	57.5	10.8*	23.0	79.0	71.5	7.5*	16.0
7th Quarter***	73.8	64.4	9.4*	19.7	68.1	60.8	7.2	15.1	71.1	68.7	2.4	4.9
8th Quarter***	77.4	67.1	10.3**	22.0	70.2	58.2	12.1**	25.9	74.1	71.1	3.0	6.3
AFDC/TANF Receipt												
Ever Received AFDC/TANF***	57.2	59.4	-2.2	-4.4	35.5	23.3	12.3***	24.6	40.6	43.3	-2.7	-5.4
Received AFDC/TANF in:												
1st Quarter***	41.7	42.3	-0.6	-1.4	20.8	15.3	5.5	11.8	28.7	32.5	-3.9	-8.2
2nd Quarter***	41.7	46.9	-5.2	-11.0	22.7	16.0	6.7*	14.0	29.0	34.0	-5.0	-10.5
3rd Quarter***	46.3	49.8	-3.5	-7.3	23.1	20.7	2.4	5.0	31.0	32.2	-1.2	-2.5
4th Quarter***	40.7	44.8	-4.1	-8.9	22.3	17.3	5.0	10.8	26.3	28.2	-1.8	-4.0
5th Quarter***	40.6	44.9	-4.3	-9.3	18.9	15.7	3.2	6.9	26.8	26.8	-0.0	-0.1
6th Quarter***	37.3	45.7	-8.4*	-18.2	15.4	13.5	1.9	4.1	27.9	25.9	2.0	4.3
7th Quarter***	31.7	40.1	-8.4*	-19.1	14.0	9.8	4.3	9.7	20.6	19.3	1.4	3.1
8th Quarter***	30.4	34.2	-3.9	-9.1	12.5	9.4	3.1	7.3	20.5	18.4	2.2	5.1
Total AFDC/TANF Benefits ($)*	$2,804	$3,579	-$775**	-20.1	$1,670	$1,379	$291	7.5	$2,065	$1,978	$87	2.3
Receipt of Other Welfare Benefits												
Ever Received Welfare***	76.4	81.0	-4.6	-9.7	50.1	41.3	8.8*	18.8	65.6	65.3	0.3	0.7
Total Welfare Benefits ($)*	$6,872	$8,395	-$1,522**	-20.1	$2,719	$1,858	$860	11.4	$5,087	$4,863	$224	3.0
Ever Received Food Stamps***	67.6	73.0	-5.5	-11.1	43.5	35.1	8.5*	17.3	58.7	60.2	-1.6	-3.2
Total Food Stamp Benefits ($)	$2,739	$2,976	-$237	-8.7	$1,137	$785	$353	13.0	$2,147	$1,867	$280	10.3
Income/Poverty												
Income Above Poverty Level***	36.9	38.2	-1.3	-2.7	38.8	40.0	-1.2	-2.4	45.2	45.5	-0.3	-0.5
Subsequent Births												
Subsequent Birth by 24 Months after Random Assignment***	24.2	29.0	-4.9	-10.8	16.1	25.9	-9.8*	-21.8	19.8	30.2	-10.4**	-23.1
Sample Size	373	336	709		250	225	475		393	376	769	

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

TABLE VII.12 (*continued*)

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE VII.13

IMPACTS ON SERVICE RECEIPT DURING THE FIRST 28 MONTHS, BY MAIN LANGUAGE SPOKEN AT HOME

	English			Other Language		
	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant
Any Services						
Any Key Services***a,b	95.0	82.5	12.5***	95.1	70.9	24.2***
Any Home Visits Or Center-Based Child Care***	91.8	59.2	32.6***	90.9	47.4	43.5***
More Than 1 Home Visit or 2 Weeks Center-Based Child Care***	90.7	53.8	37.0***	90.9	37.6	53.4***
Home Visits or Center Care at Required Intensity in at Least 1 Followup***	73.1	16.3	56.7***	58.3	5.4	52.9***
Home Visits or Center Care at Required Intensity in All 3 Followups***	29.2	4.3	25.0***	21.9	1.2	20.8***
Home Visits						
Any Home Visits***	84.8	33.2	51.6***	83.3	28.4	54.9***
Any Child Development Services During Home Visits***	83.4	31.2	52.2***	82.0	21.9	60.1***
Weekly Home Visits, 1st Follow-Up Period***	43.8	4.2	39.6***	32.8	1.3	31.6***
Weekly Home Visits, 2nd Follow-Up Period***	30.9	2.3	28.6***	39.3	2.8	36.5***
Weekly Home Visits, 3rd Follow-Up Period***	25.0	2.8	22.2***	36.0	2.1	33.9***
Weekly Home Visits in At Least 1 Followup***	53.2	6.0	47.2***	50.4	2.4	48.0***
Weekly Home Visits in All 3 Followups***	16.4	0.7	15.8***	16.3	0.4	15.8***
Child Care						
Any Child Care***	90.2	85.3	4.9***	77.5	67.6	9.9*
Any Center-Based Child Care***	55.4	39.4	16.0***	36.4	28.5	7.9
Average Hours Per Week of Center-Based Care	7.1	3.8	3.3***	3.0	1.9	1.1
Concurrent Child Care Arrangements***	55.8	49.1	6.7**	41.2	28.1	13.1**
Average Weekly Out-of-Pocket Cost of Care	$4.55	$8.23	-$3.67***	$4.03	$6.14	-$2.11
Received a Child Care Subsidy***	32.0	35.0	-3.0	12.4	18.7	-6.2
Child Was in Care at 12 Months of Age***	73.1	59.5	13.6***	46.3	46.4	-0.1
Child Was in Care at 24 Months of Age***	66.9	60.0	6.9**	46.4	30.1	16.2**
Case Management						
Any Case Management Meetings***	86.1	58.7	27.4***	79.6	39.1	40.5***
Weekly Case Management, 1st Follow-Up Period***	48.3	10.3	38.0***	31.3	4.6	26.7***
Weekly Case Management, 2nd Follow-Up Period***	33.2	5.4	27.7***	27.8	4.4	23.4***
Weekly Case Management, 3rd Follow-Up Period***	26.0	4.4	21.6***	25.7	3.5	22.3***
Group Activities						
Any Group Parenting Activities***	68.6	36.7	31.9***	77.2	33.3	43.9***
Any Parent-Child Group Activities**	37.2	15.2	22.0***	56.7	9.1	47.6***

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TABLE VII.13 (*continued*)

	English			Other Language		
	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant
Early Intervention Services						
Identification of Child's Disability***	7.4	6.1	1.3	5.9	3.5	2.3
Services for Child With Disability***	5.2	3.6	1.6	2.7	2.7	0.1
Child Health Services						
Any Child Health Services***	100.0	99.8	0.2	100.0	100.0	0.0
Any Doctor Visits***	99.3	98.9	0.4	97.3	96.8	0.5
Any Emergency Room Visits***	57.4	55.5	2.0	40.7	45.4	-4.7
Number of Emergency Room Visits for Injuries	0.3	0.3	-0.0	0.0	0.1	-0.1**
Any Dentist Visits***	28.7	28.1	0.6	27.3	28.8	-1.5
Any Screening Tests***	67.4	67.9	-0.5	59.8	59.4	0.5
Any Immunizations***	98.9	97.9	1.0	98.4	97.6	0.8
Family Development Services						
Any Education-Related Services***	88.1	62.6	25.5***	83.5	52.3	31.3***
Any Employment-Related Services***	77.9	50.9	27.1***	74.7	21.9	52.8***
Any Family Health Services[c]	100.0	100.0	0.0	100.0	100.0	0.0
Any Family Mental Health Services***	27.2	24.9	2.3	12.0	8.8	3.2
Transportation Assistance***	33.4	25.7	7.7***	27.0	14.6	12.4**
Housing Assistance***	61.7	60.2	1.5	36.4	38.8	-2.5
Sample Size	**824**	**751**	**1,575**	**216**	**210**	**426**

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroups are included in the estimates for each subgroup.

[a] Home visits, case management, center-based child care, and/or group parenting activities.

[b] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups in the first two columns.

[c] There is no variance across subgroups due to lack of variance in level of services.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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TABLE VII.14

IMPACTS ON CHILD AND FAMILY OUTCOMES AT AGE 3, BY MAIN LANGUAGE SPOKEN AT HOME

	English				Other Language			
Outcome	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c
Child Cognitive and Language Development								
Bayley Mental Development Index (MDI) Standard Score	92.1	89.8	2.3***	17.8	89.3	88.0	1.3	9.9
Percentage with MDI < 85***^{d}	25.0	30.5	-5.5*	-11.8	26.8	44.6	-17.9*	-26.7
Peabody Picture Vocabulary Test (PPVT)-III Standard Score	84.4	82.0	2.4**	14.6	^{e}	^{e}	^{e}	^{e}
Percentage with PPVT-III < 85***	49.1	55.4	-6.3**	-12.6	^{e}	^{e}	^{e}	^{e}
Test de Vocabulario Imagenes Peabody(TVIP)	^{e}	^{e}	^{e}	^{e}	97.1	94.9	2.3	26.3
Child Social-Emotional Development								
Engagement of Parent During Parent-Child Semistructured Play**	4.9	4.6	0.3***	24.5	4.6	4.7	-0.1	-12.8
Sustained Attention with Objects During Parent-Child Semistructured Play*	5.1	4.8	0.2***	22.9	4.7	4.8	-0.1	-12.5
Engagement of Parent During Parent-Child Puzzle Challenge Task*	5.1	4.9	0.2**	18.4	4.9	5.0	-0.1	-9.5
Persistence During Parent-Child Puzzle Challenge Task	4.6	4.5	0.1	9.7	4.5	4.6	-0.1	-11.7
Bayley Behavioral Rating Scale (BRS): Emotional Regulation	4.0	4.0	-0.0	-0.4	3.9	3.9	0.1	8.0
Bayley BRS: Orientation/ Engagement	3.9	3.9	0.0	0.9	3.6	3.5	0.2	20.0
Negativity Toward Parent During Parent-Child Semistructured Play	1.2	1.3	-0.1*	-13.8	1.2	1.2	0.1	10.6
Frustration During Parent-Child Puzzle Challenge Task*	2.7	4.5	-0.0	-2.8	2.9	2.4	0.5*	34.4
Child Behavior Checklist—Aggressive Behavior	10.6	11.7	-1.2***	-18.3	10.3	10.4	-0.2	-2.6
Child Health Status								
Child's Health Status	4.1	4.1	-0.0	-3.4	3.8	3.9	-0.1	-11.7
Percentage of Children in Fair or Poor Health***	8.0	7.6	0.4	1.4	14.5	7.3	7.2	25.2
Quality of the Home Environment and Parenting: Overall and Physical Environment								
Home Observation for Measurement of the Environment (HOME) Total Score	27.6	26.8	0.7**	14.9	27.0	27.1	-0.2	-3.0
HOME Internal Physical Environment	7.7	7.7	0.0	1.5	8.0	8.3	-0.3	-16.3
Parenting Behavior: Emotional Support								
HOME Warmth	2.5	2.4	0.1*	11.9	2.7	2.7	-0.1	-7.2
Supportiveness During Parent-Child Semistructured Play	4.1	3.9	0.2***	19.6	3.7	3.7	0.1	4.9
Supportive Presence During Parent-Child Puzzle Challenge Task	4.5	4.5	0.1	4.6	4.0	3.9	0.1	6.9

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TABLE VII.14 *(continued)*

	English				Other Language			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Parenting Behavior: Stimulation of Language and Learning								
Percentage of Children with a Regular Bedtime***	59.4	56.8	2.5	5.1	56.9	57.8	-0.9	-1.9
Percentage of Children Who Follow a Bedtime Routine***	67.4	69.6	-2.2	-4.8	64.3	66.3	-2.0	-4.4
HOME: Support of Language and Learning	10.8	10.6	0.2*	10.4	10.0	9.7	0.3	13.3
Parent-Child Play	4.4	4.4	0.0	4.8	4.3	4.1	0.1	15.3
Quality of Assistance During Parent-Child Puzzle Challenge Task	3.7	3.5	0.1	10.0	3.4	3.1	0.4**	29.8
Percentage of Parents Who Read to Child Daily***	59.0	55.1	3.9	7.8	44.9	38.1	6.8	13.6
Percentage of Parents Who Read to Child at Bedtime***	34.6	31.4	3.2	7.0	17.8	24.9	-7.1	-15.6
Parenting Behavior: Negative Parenting Behavior								
Detachment During Parent-Child Semistructured Play	1.2	1.3	-0.1*	-11.3	1.2	1.3	-0.1	-15.0
Intrusiveness During Parent-Child Semistructured Play	1.6	1.6	-0.0	-5.1	1.6	1.5	0.1	8.3
Detachment During Parent-Child Puzzle Challenge Task	1.7	1.7	-0.1	-6.5	1.7	1.6	0.1	13.9
Intrusiveness During Parent-Child Puzzle Challenge Task	2.6	2.7	-0.1	-7.9	2.8	3.1	-0.3	-22.3
Negative Regard During Parent-Child Semistructured Play	1.3	1.3	0.0	2.4	1.1	1.1	-0.1	-9.5
HOME Harshness	0.3	0.3	-0.0	-1.1	0.3	0.1	0.1*	23.1
Percentage of Parents Who Spanked Child in the Past Week***	52.0	58.0	-6.0*	-12.1	29.1	35.4	-6.4	-12.1
Knowledge of Safety Practices and Discipline Strategies								
Percentage of Parents Who Usually Use a Car Seat Correctly***	68.2	68.9	-0.7	-1.5	74.0	73.9	0.1	0.2
Percentage of Parents Suggesting Physical Punishment as a Discipline Strategy***	50.2	57.7	-7.5***	-15.0	32.3	31.6	0.8	1.6
Percentage of Parents Who Would Use Mild Discipline Only***	42.6	35.6	7.0**	14.2	49.8	49.8	-0.1	-0.1
Index of Severity of Discipline Strategies	3.5	3.7	-0.3***	-17.1	3.0	3.0	0.1	3.8
Parent Physical and Mental Health								
Parent's Health Status	3.4	3.5	-0.1	-6.1	3.4	3.5	-0.1	-8.1
Parenting Stress Index (PSI) Parental Distress	24.5	25.2	-0.8	-8.2	24.9	27.2	-2.3	-24.5
PSI Parent-Child Dysfunctional Interaction	17.3	17.7	-0.4	-7.0	19.0	18.5	0.5	8.2
Center for Epidemiological Studies Depression (CES-D; Short Form)	7.9	8.4	-0.6	-7.9	5.8	5.6	0.2	2.9
CES-D Severe Depressive Symptoms ***	15.9	17.5	-1.6	-4.4	13.5	8.5	5.0	13.9
Family Environment Scale (FES): Family Conflict	1.7	1.7	-0.0	-8.2	1.7	1.6	0.1	9.1

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TABLE VII.14 (*continued*)

	English					Other Language			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]		Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
			Father Presence						
Currently Married To Biological Father ***	26.9	28.8	-1.9	-4.0		61.5	55.0	6.6	13.5
Biological Father is Currently Married to, Lives with, or is Boyfriend of Respondent***	42.0	44.8	-2.8	-5.6		74.6	66.7	7.9	15.7
Biological Father Currently Present in Child's Life***	69.9	67.7	2.3	5.0		87.4	78.9	8.5	19.0
Continuous Biological Father Presence Child Age 14-36 Months***	63.7	62.6	1.1	2.4		86.1	87.3	-1.2	-2.6
No Biological Father Presence Child Age 14-36 Months***	13.4	14.0	-0.6	-1.9		5.5	5.5	0.1	0.2
Continuous Male Presence Child Age 14-36 Months***	78.5	80.2	-1.7	-4.8		88.5	88.9	-0.4	-1.0
No Male Presence Child Age 14-36 Months***	2.8	1.9	0.9	7.1		0.7	1.6	-0.9	-7.1
Sample Size									
Bayley	668	589	1,257			184	156	340	
Parent Interview	856	762	1,618			216	195	411	
Parent-Child Interactions	665	587	1,252			182	161	343	

SOURCE: Parent interviews, child assessments, interviewer observations, and assessments of semistructured parent-child interactions conducted when children were approximately 36 months old.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

[e] Mothers whose primary language is Spanish were administered the Test de Vocabulario Imagenes Peabody (TVIP) Adaptacion Hispanoamericana.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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TABLE VII.15

IMPACTS ON SELF-SUFFICIENCY AT 28 MONTHS, BY MAIN LANGUAGE SPOKEN AT HOME

	English				Other Language			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Education/Job Training								
Ever in Education or Training***[d]	64.4	55.7	8.7***	17.5	53.3	46.4	6.9	13.8
Ever in High School***	15.5	10.5	5.1***	17.8	14.7	8.6	6.1*	21.2
Ever in ESL Class***	0.2	0.2	-0.0	-0.2	17.6	11.9	5.8	40.3
Ever in Vocational Program***	23.1	20.6	2.5	6.7	10.1	8.6	1.5	3.9
Average Hours per Week in Education or Training	5.1	4.0	1.0**	16.1	2.8	2.8	-0.0	-0.4
In Education or Training:								
1st Quarter***	24.7	24.7	0.0	0.0	17.4	16.1	1.3	3.2
2nd Quarter***	29.4	27.8	1.6	3.7	25.8	22.7	3.1	7.1
3rd Quarter***	33.8	29.1	4.7*	10.7	29.5	21.8	7.7	17.5
4th Quarter***	32.2	28.0	4.2	9.9	30.0	17.6	12.4**	28.9
5th Quarter***	33.4	27.9	5.5**	12.8	28.1	20.7	7.5	17.3
6th Quarter***	32.4	25.8	6.6**	16.0	20.8	17.9	2.9	6.9
7th Quarter***	28.5	23.2	5.3**	13.2	20.8	18.0	2.8	6.9
8th Quarter***	31.5	21.5	10.0***	25.5	22.0	15.7	6.4	16.3
Have High School Diploma***	56.3	54.0	2.3	4.6	23.5	31.8	-8.3	-16.6
Have GED***	11.2	13.2	-2.0	-6.3	3.9	6.4	-2.6	-8.1
Employment								
Ever Employed***	87.7	84.4	3.3	8.8	84.8	81.1	3.7	9.9
Average Hours/Week Employed	17.7	17.5	0.2	1.3	18.1	17.4	0.7	4.7
Employed in:								
1st Quarter***	38.7	38.5	0.2	0.4	39.4	38.8	0.5	1.1
2nd Quarter***	46.8	45.4	1.4	2.7	48.7	49.8	-1.0	-2.1
3rd Quarter***	53.6	52.1	1.6	3.1	54.1	58.5	-4.4	-8.9
4th Quarter***	56.6	56.4	0.2	0.3	57.4	56.3	1.1	2.1
5th Quarter***	61.0	62.6	-1.6	-3.2	63.2	56.9	6.2	12.6
6th Quarter***	66.0	61.4	4.6	9.3	64.4	61.2	3.2	6.5
7th Quarter***	59.8	59.1	0.7	1.5	66.7	57.5	9.2	18.6
8th Quarter***	64.5	63.7	0.8	1.7	72.0	57.0	15.0**	30.7
Any Self-Sufficiency-Oriented Activty (Education, Training or Employment)								
Ever Employed or in Education/Training***	95.9	92.4	3.5**	11.6	93.2	90.1	3.1	10.1
Average Hours per Week in Any Activity	23.2	22.0	1.2	7.8	21.9	20.3	1.6	10.3
In Activities in:								
1st Quarter***	55.2	54.7	0.4	0.9	50.1	47.9	2.2	4.4
2nd Quarter***	65.0	60.6	4.4	8.9	61.8	62.9	-1.1	-2.2
3rd Quarter***	72.1	69.0	3.1	6.6	67.2	67.0	0.2	0.4
4th Quarter***	72.1	69.8	2.3	4.8	73.5	63.4	10.2*	21.3
5th Quarter***	75.7	74.7	1.0	2.2	72.9	64.7	8.2	17.8
6th Quarter***	79.6	71.8	7.9***	16.7	74.6	67.1	7.5	16.0
7th Quarter***	73.3	68.9	4.4	9.1	74.4	66.5	7.9	16.5
8th Quarter***	76.7	72.1	4.6	9.9	81.7	62.4	19.3***	41.4

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433

TABLE VII.15 (*continued*)

	English				Other Language			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
AFDC/TANF Receipt								
Ever Received AFDC/TANF***	51.8	50.9	0.9	1.8	26.8	24.0	2.8	5.6
Received AFDC/TANF in:								
1st Quarter***	37.4	34.7	2.6	5.6	19.8	17.4	2.3	5.0
2nd Quarter***	38.4	37.2	1.2	2.5	19.2	17.3	1.9	4.0
3rd Quarter***	41.1	37.2	4.0	8.3	18.2	20.8	-2.6	-5.4
4th Quarter***	35.0	34.7	0.3	0.7	16.3	18.2	-1.9	-4.1
5th Quarter***	34.2	32.6	1.6	3.4	13.8	17.2	-3.4	-7.5
6th Quarter***	30.4	30.3	0.1	0.2	16.9	17.9	-1.0	-2.2
7th Quarter***	27.7	26.7	1.0	2.3	9.0	15.4	-6.4	-14.6
8th Quarter***	25.5	25.0	0.6	1.4	10.1	11.1	-1.0	-2.4
Total AFDC/TANF Benefits ($)*	$2,163	$2,114	$49	1.3	$1,167	$1,515	-$348	-9.0
Receipt of Other Welfare Benefits								
Ever Received Welfare***	73.0	72.9	0.1	0.2	41.3	40.7	0.6	1.2
Total Welfare Benefits ($)*	$5,828	$6,041	-$213	-2.8	$2,575	$2,766	-$191	-2.5
Ever Received Food Stamps***	64.1	65.6	-1.5	-3.1	37.9	34.6	3.2	6.6
Total Food Stamp Benefits ($)	$2,329	$2,298	$32	1.2	$994	$1,022	-$28	-1.0
Income/Poverty								
Income Above Poverty Level***	43.5	45.0	-1.5	-3.0	47.2	37.9	9.4	19.0
Subsequent Births								
Subsequent Birth by 24 Months after Random Assignment***	21.4	29.9	-8.5***	-18.9	14.8	20.9	-6.1	-13.7
Sample Size	824	751	1,575		216	210	426	

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE VII.16

IMPACTS ON SERVICE RECEIPT DURING THE FIRST 28 MONTHS, BY NUMBER OF MATERNAL RISK FACTORS

	0 to 2 Risk Factors			3 Risk Factors			4 to 5 Risk Factors		
	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant
Any Services									
Any Key Services***a,b	97.9	80.7	17.2***	96.6	87.5	8.2***	94.3	73.7	20.6***
Any Home Visits Or Center-Based Child Care***	96.5	56.5	40.0***	94.0	60.4	33.6***	91.7	57.0	34.8***
More Than 1 Home Visit or 2 Weeks Center-Based Child Care***	95.9	52.7	43.2***	93.3	51.8	41.5***	89.5	52.2	37.3***
Home Visits or Center Care at Required Intensity in at Least 1 Followup***	78.7	11.7	67.0***	77.0	10.7	66.4***	66.0	11.4	54.6***
Home Visits or Center Care at Required Intensity in All 3 Followups**	32.4	4.5	27.9***	36.0	-0.7	36.7***	19.4	2.6	16.8***
Home Visits									
Any Home Visits***	92.4	30.7	61.6***	89.4	36.8	52.6***	89.2	39.7	49.5***
Any Child Development Services During Home Visits***	91.9	29.2	62.8***	89.6	34.0	55.6***	86.8	38.1	48.7***
Weekly Home Visits, 1st Follow-Up Period***	47.8	1.8	46.1***	53.7	4.0	49.7***	49.4	6.7	42.7***
Weekly Home Visits, 2nd Follow-Up Period***	38.4	2.1	36.4***	40.6	3.1	37.5***	36.9	-0.5	37.4***
Weekly Home Visits, 3rd Follow-Up Period***	30.4	1.8	28.6***	34.0	3.6	30.4***	23.1	3.0	20.1***
Weekly Home Visits in At Least 1 Followup***	59.5	4.1	55.4***	65.3	6.6	58.7***	63.7	8.0	55.7***
Weekly Home Visits in All 3 Followups***	20.9	0.4	20.5***	23.5	-0.1	23.6***	12.3	0.31	12.1***
Child Care									
Any Child Care***	85.5	77.2	8.3***	85.6	82.6	3.0	87.5	80.0	7.5*
Any Center-Based Child Care***	48.7	33.9	14.8***	49.8	34.0	15.8***	41.8	31.3	10.4*
Average Hours Per Week of Center-Based Care	6.3	3.3	3.0***	5.6	2.1	3.5***	4.0	2.0	2.0*
Concurrent Child Care Arrangements***	51.2	47.6	3.6	51.9	45.2	6.7	40.1	31.7	8.4
Average Weekly Out-of-Pocket Cost of Care*	$5.11	$9.43	-$4.32***	$2.45	$6.21	-$3.67***	$4.14	$3.24	$0.91
Received a Child Care Subsidy***	27.0	24.7	2.4	36.9	46.4	-9.5	56.3	50.3	6.0
Child Was in Care at 12 Months of Age***	68.2	54.1	14.1***	62.5	61.1	1.4	64.0	53.9	10.2
Child Was in Care at 24 Months of Age***	68.8	57.6	11.2***	53.4	50.1	3.2	59.2	41.1	18.1*
Case Management									
Any Case Management Meetings***	89.3	52.8	36.5***	89.4	60.2	29.2***	86.7	54.4	32.3***
Weekly Case Management, 1st Follow-Up Period***	49.3	7.0	42.3***	46.3	9.1	37.2***	45.4	13.0	32.4***
Weekly Case Management, 2nd Follow-Up Period***	35.8	4.2	31.6***	34.8	6.6	28.3***	35.4	2.3	33.1***
Weekly Case Management, 3rd Follow-Up Period***	30.7	4.0	26.7***	27.1	8.2	18.9***	21.2	3.7	17.6***

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TABLE VII.16 (*continued*)

	0 to 2 Risk Factors			3 Risk Factors			4 to 5 Risk Factors		
	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant
Group Activities									
Any Group Parenting Activities***	74.7	37.8	36.9***	72.5	34.9	37.5***	60.3	29.8	30.5***
Any Parent-Child Group Activities***	44.7	16.0	28.7***	43.5	10.6	32.8***	33.2	10.5	22.7***
Early Intervention Services									
Identification of Child's Disability***	9.6	5.3	4.2**	4.5	4.9	-0.4	3.3	3.3	0.0
Services for Child With Disability***	6.7	3.9	2.8*	3.0	3.3	-0.3	2.9	0.5	2.4
Child Health Services									
Any Child Health Services***	100.0	100.0	0.0	100.0	99.7	0.4	100.0	99.1	1.2
Any Doctor Visits***	99.2	98.9	0.3	98.9	99.1	-0.2	99.7	95.1	4.6**
Any Emergency Room Visits***	52.2	50.7	1.5	55.4	56.0	-0.6	55.2	59.6	-4.5
Number of Emergency Room Visits for Injuries	0.2	0.3	-0.1**	0.3	0.3	0.0	0.2	0.2	-0.0
Any Dentist Visits***	28.5	27.7	0.7	26.8	28.2	-1.5	24.3	18.8	5.5
Any Screening Tests***	64.3	63.6	0.7	66.0	65.9	0.1	64.9	69.0	-4.0
Any Immunizations***	100.0	98.5	1.5**	98.2	97.2	1.0	97.0	97.3	-0.4
Family Development Services									
Any Education-Related Services***	84.7	49.5	35.2***	88.0	63.1	24.9***	87.3	61.0	26.4***
Any Employment-Related Services***	76.3	38.3	38.0***	79.3	57.4	21.9***	78.2	55.8	22.4***
Any Family Health Services[c]	100.0	100.0	0.0	100.0	100.0	0.0	100.0	100.0	0.0
Any Family Mental Health Services***	22.3	19.9	2.4	25.7	20.8	5.0	23.1	24.7	-1.6
Transportation Assistance***	29.1	18.2	10.8***	35.5	26.8	8.7**	41.7	32.7	9.0
Housing Assistance***	52.7	45.6	7.1*	61.3	60.5	0.8	71.2	69.3	1.9
Sample Size	**425**	**402**	**827**	**273**	**292**	**565**	**246**	**228**	**474**

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroups are included in the estimates for each subgroup. The risk factors included in the count are: (1) being a teenage mother; (2) having no high school credential; (3) receiving public assistance; (4) not being employed or in school or job training; and (5) being a single mother.

[a] Home visits, case management, center-based child care, and/or group parenting activities.

[b] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups in the first two columns. The third column is a subset of the second column and is included to aid interpretation of subgroup differences.

[c] There is no variance across subgroups due to lack of variance in level of services.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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TABLE VII.17

IMPACTS ON CHILD AND FAMILY OUTCOMES AT AGE 3, BY NUMBER OF MATERNAL RISK FACTORS

	0 to 2 Risk Factors				3 Risk Factors				4 to 5 Risk Factors			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Child Cognitive and Language Development												
Bayley Mental Development Index (MDI) Standard Score*[d]	91.8	91.7	0.2	1.4	93.3	90.2	3.2**	24.5	88.2	90.0	-1.8	-13.9
Percentage with MDI < 85***	24.3	29.2	-4.9	-10.4	25.7	24.8	0.9	1.9	40.6	27.2	13.4	28.8
Peabody Picture Vocabulary Test (PPVT)-III Standard Score**	87.3	85.0	2.3	14.2	84.4	85.3	-1.0	-5.9	79.7	85.0	-5.4**	-32.9
Percentage with PPVT-III < 85***	37.4	47.0	-9.7*	-19.4	54.1	49.3	4.8	9.5	62.2	48.9	13.3	26.7
Child Social-Emotional Development												
Engagement of Parent During Parent-Child Semistructured Play	4.9	4.7	0.2*	15.0	4.8	4.6	0.2	21.2	4.5	4.6	-0.1	-6.4
Sustained Attention with Objects During Parent-Child Semistructured Play	5.0	5.0	0.1	6.8	5.0	4.9	0.2	16.1	4.9	4.8	0.2	19.6
Engagement of Parent During Parent-Child Puzzle Challenge Task	5.1	5.1	0.0	0.9	5.0	5.0	0.0	1.2	4.9	5.0	-0.2	-18.4
Persistence During Parent-Child Puzzle Challenge Task***	4.7	4.6	0.1	6.0	4.6	4.5	0.2	15.9	4.1	4.8	-0.7***	-63.5
Bayley Behavioral Rating Scale (BRS): Emotional Regulation	4.0	4.0	-0.0	-2.5	3.9	3.9	0.0	3.4	3.8	3.9	-0.1	-11.3
Bayley BRS: Orientation/ Engagement	3.8	3.8	0.0	0.1	3.8	3.8	-0.0	-1.4	3.8	4.0	-0.2*	-31.1
Negativity Toward Parent During Parent-Child Semistructured Play	1.2	1.3	-0.1	-11.2	1.3	1.4	-0.1	-14.2	1.3	1.3	-0.0	-0.2
Frustration During Parent-Child Puzzle Challenge Task*	2.8	2.9	-0.2	-11.4	2.8	2.8	-0.0	-1.5	2.8	2.2	0.6*	40.6

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TABLE VII.17 *(continued)*

	0 to 2 Risk Factors				3 Risk Factors				4 to 5 Risk Factors			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Child Behavior Checklist—Aggressive Behavior***	11.2	11.7	-0.5	-7.9	10.9	11.3	-0.3	-5.2	11.7	11.8	-0.1	-1.1
Child Health Status												
Child's Health Status	4.0	4.0	0.0	1.0	4.0	4.0	0.1	7.3	4.0	3.9	0.0	2.7
Percentage of Children in Fair or Poor Health***	7.3	9.4	-2.1	-7.3	5.4	8.2	-2.9	-10.0	11.7	7.2	4.5	15.9
Quality of the Home Environment and Parenting: Overall and Physical Environment												
Home Observation for Measurement of the Environment (HOME) Total Score	28.1	28.6	-0.4	-8.7	27.4	27.0	0.4	7.6	25.9	26.3	-0.5	-9.6
HOME Internal Physical Environment	7.9	8.0	-0.1	-6.2	7.7	7.9	-0.2	-11.7	7.7	7.8	-0.1	-7.7
Parenting Behavior: Emotional Support												
HOME Warmth	2.6	2.7	-0.1	-6.9	2.5	2.5	0.1	6.3	2.4	2.6	-0.2	-19.6
Supportiveness During Parent-Child Semistructured Play	4.1	4.1	0.0	3.1	4.0	3.7	0.3**	31.1	3.7	3.7	0.0	0.7
Supportive Presence During Parent-Child Puzzle Challenge Task*	4.8	4.7	0.0	2.5	4.5	4.1	0.4**	30.5	4.1	4.3	-0.1	-10.9
Parenting Behavior: Stimulation of Language and Learning												
Percentage of Children with a Regular Bedtime***	61.9	62.3	-0.4	-0.8	65.0	59.2	5.9	11.9	52.0	53.0	-1.1	-2.2
Percentage of Children Who Follow a Bedtime Routine***	73.2	71.7	1.5	3.2	71.2	66.4	4.8	10.3	61.5	63.6	-2.2	-4.7
HOME: Support of Language and Learning	10.7	10.9	-0.2	-11.0	10.6	10.4	0.2	10.1	10.3	10.2	0.0	1.9
Parent-Child Play***	4.3	4.4	-0.0	-1.9	4.5	4.2	0.3***	33.5	4.2	4.4	-0.2	-25.9
Quality of Assistance During Parent-Child Puzzle Challenge Task	3.8	3.7	0.1	12.0	3.5	3.3	0.3*	23.0	3.3	3.4	-0.1	-7.2
Percentage of Parents Who Read to Child Daily***	53.8	50.2	3.6	7.3	63.6	47.1	16.5***	33.1	42.8	46.8	-4.0	-8.1

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TABLE VII.17 (*continued*)

	0 to 2 Risk Factors				3 Risk Factors				4 to 5 Risk Factors			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Percentage of Parents Who Read to Child at Bedtime***	34.1	30.9	3.2	7.0	39.0	22.5	16.5***	36.2	17.9	24.4	-6.5	-14.2
Parenting Behavior: Negative Parenting Behavior												
Detachment During Parent-Child Semistructured Play*	1.2	1.1	0.0	4.3	1.3	1.5	-0.2**	-33.7	1.3	1.3	-0.1	-9.3
Intrusiveness During Parent-Child Semistructured Play	1.5	1.5	0.0	5.5	1.5	1.5	0.0	3.0	1.8	1.7	0.1	11.1
Detachment During Parent-Child Puzzle Challenge Task	1.5	1.5	-0.0	-2.5	1.7	1.8	-0.1	-15.2	1.8	1.9	-0.0	-4.1
Intrusiveness During Parent-Child Puzzle Challenge Task	2.5	2.6	-0.1	-5.8	2.7	2.7	-0.0	-1.8	3.0	2.6	0.4	28.6
Negative Regard During Parent-Child Semistructured Play	1.2	1.2	-0.0	-5.7	1.3	1.3	-0.0	-0.3	1.4	1.3	0.1	17.5
HOME Harshness**	0.2	0.2	0.0	2.4	0.3	0.3	-0.0	-3.0	0.6	0.2	0.4***	62.8
Percentage of Parents Who Spanked Child in the Past Week***	39.5	49.8	-10.3**	-20.6	47.8	50.5	-2.7	-5.4	62.5	64.0	-1.5	-2.9
Knowledge of Safety Practices and Discipline Strategies												
Percentage of Parents Who Usually Use a Car Seat Correctly***	79.3	75.6	3.7	8.0	67.9	67.8	0.2	0.4	48.5	51.1	-2.7	-5.8
Percentage of Parents Suggesting Physical Punishment as a Discipline Strategy***	38.3	46.1	-7.8**	-15.6	46.8	47.8	-1.0	-2.1	63.8	64.7	-0.9	-1.8
Percentage of Parents Who Would Use Mild Discipline Only***	49.0	44.8	4.2	8.5	46.6	43.0	3.6	7.3	32.0	28.1	3.9	8.0
Index of Severity of Discipline Strategies	3.2	3.4	-0.2*	-13.7	3.3	3.5	-0.1	-8.5	3.9	4.0	-0.1	-6.9

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TABLE VII.17 (*continued*)

	0 to 2 Risk Factors				3 Risk Factors				4 to 5 Risk Factors			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Parent Physical and Mental Health												
Parent's Health Status	3.5	3.5	-0.1	-6.8	3.4	3.3	0.1	10.2	3.3	3.5	-0.2	-20.8
Parenting Stress Index (PSI) Parental Distress**	24.9	23.9	1.0	10.5	24.3	26.8	-2.5**	-26.4	27.0	26.0	1.0	10.3
PSI Parent-Child Dysfunctional Interaction**	18.0	17.1	0.9*	14.9	17.8	18.3	-0.5	-7.6	18.1	19.3	-1.2	-19.3
Center for Epidemiological Studies Depression (CES-D; Short Form)	7.2	7.4	-0.2	-3.3	7.5	7.9	-0.4	-5.7	9.4	8.8	0.6	8.4
CES-D Severe Depressive Symptoms ***	12.4	13.8	-1.4	-3.8	15.0	17.4	-2.3	-6.5	20.8	18.6	2.3	6.2
Family Environment Scale (FES): Family Conflict	1.6	1.7	-0.0	-7.0	1.7	1.7	0.0	5.2	1.8	1.7	0.1	19.8
Father Presence												
Currently Married To Biological Father ***	52.0	55.2	-3.2	-6.6	29.7	24.4	5.2	10.8	12.8	10.8	2.0	4.1
Biological Father is Currently Married to, Lives with, or is Boyfriend of Respondent***	59.7	64.3	-4.6	-9.2	46.3	38.6	7.7	15.5	35.2	36.4	-1.2	-2.3
Biological Father Currently Present in Child's Life***	79.4	78.6	0.8	1.7	68.9	66.2	2.7	6.1	62.6	59.6	3.0	6.6
Continuous Biological Father Presence Child Age 14-36 Months***	76.6	80.2	-3.6	-7.8	58.1	52.5	5.6	12.2	43.7	43.4	0.4	0.8
No Biological Father Presence Child Age 14-36 Months***	7.5	9.6	-2.1	-6.7	19.1	15.1	4.0	12.6	17.5	30.4	-12.8	-40.9
Continuous Male Presence Child Age 14-36 Months***	85.0	91.4	-6.4**	-18.0	76.3	78.9	-2.5	7.1	80.2	90.4	-10.2	-28.5
No Male Presence Child Age 14-36 Months***	1.9	1.4	0.5	4.2	2.8	0.3	2.5	20.2	1.3	-1.7	3.0	24.7

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TABLE VII.17 *(continued)*

	0 to 2 Risk Factors				3 Risk Factors				4 to 5 Risk Factors			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Sample Size												
Bayley	344	300	644		238	209	447		193	180	373	
Parent Interview	444	400	844		304	273	577		243	224	467	
Parent-Child Interactions	346	313	659		238	210	448		196	172	368	

SOURCE: Parent interviews, child assessments, interviewer observations, and assessments of semistructured parent-child interactions conducted when children were approximately 36 months old.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE VII.18

IMPACTS ON SELF-SUFFICIENCY AT 28 MONTHS, BY NUMBER OF MATERNAL RISK FACTORS

	0 to 2 Risk Factors				3 Risk Factors				4 to 5 Risk Factors			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Education/Job Training												
Ever in Education or Training***[d]	47.9	42.6	5.4	10.8	64.6	55.3	9.2**	18.5	64.1	62.9	1.2	2.4
Ever in High School***	0.5	0.5	-0.0	-0.1	18.0	15.1	3.0	10.4	21.1	18.2	2.9	10.0
Ever in ESL Class***	5.6	4.4	1.1	8.0	1.2	1.4	-0.2	-1.1	0.9	0.4	0.5	3.5
Ever in Vocational Program***	18.2	11.6	6.5**	17.4	20.3	21.3	-1.0	-2.8	17.2	18.2	-1.1	-2.8
Average Hours per Week in Education or Training	2.4	2.1	0.3	4.9	5.6	4.3	1.3*	20.1	5.7	4.7	1.0	15.2
In Education or Training:												
1st Quarter***	16.5	19.9	-3.4	-8.3	23.4	24.7	-1.3	-3.1	24.4	23.5	0.9	2.3
2nd Quarter***	18.4	19.2	-0.9	-2.0	29.9	30.6	-0.7	-1.6	32.0	30.6	1.4	3.1
3rd Quarter***	20.1	18.8	1.3	2.9	36.5	35.6	0.9	2.1	37.1	38.8	-1.7	-3.9
4th Quarter***	21.4	19.7	1.7	4.0	37.3	31.4	5.8	13.6	31.8	38.0	-6.2	-14.5
5th Quarter***	22.5	18.0	4.4	10.3	36.8	35.3	1.5	3.5	32.4	33.7	-1.3	-2.9
6th Quarter***	22.7	15.2	7.5**	18.1	35.6	28.9	6.8	16.4	31.2	27.8	3.4	8.3
7th Quarter***	18.7	15.8	2.9	7.2	27.3	25.2	2.1	5.2	27.4	25.1	2.2	5.5
8th Quarter***	20.9	14.0	6.9**	17.6	26.4	24.8	1.5	3.9	24.2	26.8	-2.6	-6.6
Have High School Diploma***	66.3	62.4	3.8	7.7	46.5	48.5	-2.0	-3.9	26.2	20.4	5.8	11.5
Have GED***	8.0	9.6	-1.6	-5.1	12.5	11.7	0.8	2.6	13.8	13.5	0.4	1.1
Employment												
Ever Employed***	88.8	86.1	2.8	7.3	87.2	82.0	5.2	13.8	84.6	78.8	5.8	15.5
Average Hours/Week Employed	21.0	19.5	1.5	10.1	15.8	14.9	0.8	5.5	11.3	10.7	0.6	4.3
Employed in:												
1st Quarter***	55.5	48.5	7.0**	14.5	31.2	32.2	-1.0	-2.1	17.6	24.9	-7.3	-15.1
2nd Quarter***	59.8	54.2	5.6**	11.2	39.6	40.0	-0.3	-0.6	25.8	35.5	-9.7*	-19.5
3rd Quarter***	64.8	62.3	2.5	4.9	50.0	46.2	3.9	7.7	33.2	37.5	-4.2	-8.4
4th Quarter	67.0	65.9	1.0	2.1	57.3	49.4	7.9*	15.8	43.5	37.0	6.5	13.0
5th Quarter***	70.4	67.8	2.6	5.3	63.0	56.0	7.0	14.2	50.0	50.3	-0.3	-0.6
6th Quarter	70.0	62.0	8.0**	16.3	63.2	60.1	3.1	6.3	51.7	45.9	5.9	11.9
7th Quarter***	67.3	62.2	5.1	10.2	57.2	54.7	2.6	5.2	48.1	43.0	5.1	10.3
8th Quarter***	68.0	64.2	3.8	7.8	60.5	55.1	5.4	11.1	54.0	49.3	4.6	9.5
Any Self-Sufficiency-Oriented Activity (Education, Training or Employment)												
Ever Employed or in Education/Training***	94.8	91.8	3.0	9.8	92.1	88.4	3.7	12.2	95.9	92.0	3.9	12.7
Average Hours per Week in Any Activity	23.5	22.1	1.4	8.6	21.9	18.7	3.2*	20.1	17.7	15.5	2.2	13.9
In Activities in:												
1st Quarter***	63.6	57.5	6.1*	12.1	46.8	47.8	-1.0	-2.0	38.2	42.2	-4.1	-8.1
2nd Quarter***	67.5	62.0	5.6*	11.3	59.1	56.8	2.4	4.8	49.4	52.5	-3.0	-6.1

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TABLE VII.18 *(continued)*

	0 to 2 Risk Factors				3 Risk Factors				4 to 5 Risk Factors			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
3rd Quarter***	72.7	70.8	1.9	4.0	71.0	63.8	7.2*	15.2	59.1	59.4	-0.3	-0.6
4th Quarter***	75.0	72.1	2.9	6.1	73.5	64.1	9.4**	19.7	62.1	59.8	2.3	4.9
5th Quarter***	76.4	72.9	3.5	7.5	77.1	70.8	6.4	13.7	68.8	68.1	0.7	1.5
6th Quarter	77.1	68.0	9.1***	19.4	77.3	71.1	6.3	13.3	69.3	61.9	7.4	15.8
7th Quarter***	72.8	68.8	4.0	8.4	68.8	65.0	3.9	8.1	62.1	57.2	4.9	10.3
8th Quarter***	73.0	70.7	2.3	5.0	71.2	65.3	5.9	12.6	65.1	64.6	0.6	1.2
AFDC/TANF Receipt												
Ever Received AFDC/TANF***	26.4	25.8	0.7	1.3	52.6	55.6	-3.0	-6.1	80.9	70.9	10.0**	20.0
Received AFDC/TANF in:												
1st Quarter***	15.0	17.1	-2.0	-4.3	39.5	33.6	5.9*	12.6	63.4	59.1	4.2	9.1
2nd Quarter***	15.7	18.6	-2.9	-6.1	42.9	39.9	3.1	6.3	64.2	56.8	7.4	15.6
3rd Quarter***	19.9	21.0	-1.1	-2.4	41.5	43.4	-1.9	-4.1	73.0	61.2	11.8**	24.6
4th Quarter***	15.4	18.3	-2.9	-6.4	34.5	38.8	-4.3	-9.2	63.0	49.1	13.9**	30.1
5th Quarter***	13.4	16.7	-3.2	-7.0	34.8	37.8	-3.0	-6.5	62.0	50.9	11.1**	24.2
6th Quarter***	13.6	16.5	-2.9	-6.4	32.5	42.1	-9.6**	-20.8	61.2	53.0	8.1	17.5
7th Quarter***	10.3	12.3	-2.0	-4.5	27.6	33.4	-5.8	-13.2	50.3	52.9	-2.5	-5.7
8th Quarter***	10.4	10.3	0.0	0.1	23.4	32.7	-9.3**	-21.8	49.3	47.8	1.5	3.6
Total AFDC/TANF Benefits ($)	$856	$1,061	-$206	-5.3	$3,244	$3,464	-$220	-5.7	$4,970	$5,432	-$463	-12.0
Receipt of Other Welfare Benefits												
Ever Received Welfare***	53.4	49.7	3.8	8.1	76.1	78.3	-2.2	-4.6	91.3	87.9	3.4	7.2
Total Welfare Benefits ($)	$3,057	$3,404	-$347	-4.6	$6,891	$7,018	-$127	-1.7	$10,543	$11,862	-$1,318	-17.4
Ever Received Food Stamps***	46.2	44.1	2.1	4.2	67.2	70.3	-3.0	-6.2	85.2	80.6	4.6	9.4
Total Food Stamp Benefits ($)*	$1,169	$1,267	-$98	-3.6	$3,115	$2,439	$676**	24.8	$3,731	$3,587	$144	5.3
Income/Poverty												
Income Above Poverty Level***	50.5	53.6	-3.1	-6.2	36.7	29.9	6.8	13.9	25.1	18.2	6.9	14.0
Subsequent Births												
Subsequent Birth by 24 Months after Random Assignment***	20.5	25.1	-4.6	-10.2	23.2	27.0	-3.8	-8.5	23.7	38.6	-14.9**	-33.1
Sample Size	**425**	**402**	**827**		**292**	**273**	**565**		**246**	**228**	**474**	

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

TABLE VII.18 (*continued*)

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE VII.19

IMPACTS ON SERVICE RECEIPT DURING THE FIRST 28 MONTHS, BY MOTHER'S RISK OF DEPRESSION AT ENROLLMENT

	Mother at Risk of Depression (CES-D >= 16)			Mother Not at Risk of Depression (CES-D < 16)		
	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant
Any Services						
Any Key Services***a,b	99.2	83.1	16.1***	96.8	76.9	19.9***
Any Home Visits Or Center-Based Child Care***	96.9	54.7	42.2***	96.0	54.0	41.9***
More Than 1 Home Visit or 2 Weeks Center-Based Child Care***	95.9	45.7	50.2***	94.4	49.6	44.8***
Home Visits or Center Care at Required Intensity in at Least 1 Followup***	85.0	12.6	72.4***	85.6	9.1	76.5***
Home Visits or Center Care at Required Intensity in All 3 Followups***	29.2	4.7	24.5***	41.8	1.3	40.5***
Home Visits						
Any Home Visits***	94.3	36.1	58.2***	92.5	34.1	58.4***
Any Child Development Services During Home Visits***	94.1	33.1	61.1***	91.9	31.8	60.1***
Weekly Home Visits, 1st Follow-Up Period***	60.6	2.4	58.2***	66.3	1.3	65.0***
Weekly Home Visits, 2nd Follow-Up Period***	43.2	4.8	38.4***	49.9	2.2	47.6***
Weekly Home Visits, 3rd Follow-Up Period***	32.6	3.7	28.9***	40.3	0.9	39.4***
Weekly Home Visits in At Least 1 Followup***	71.0	5.0	66.0***	74.3	3.8	70.5***
Weekly Home Visits in All 3 Followups***	22.1	1.3	20.7***	30.8	0.7	30.1***
Child Care						
Any Child Care***	83.1	83.5	-0.4	91.1	75.9	15.3***
Any Center-Based Child Care***	46.3	26.9	19.4***	38.5	29.8	8.7*
Average Hours Per Week of Center-Based Care	4.3	2.3	2.0***	5.5	2.3	4.0***
Concurrent Child Care Arrangements***	53.3	45.7	7.6	51.8	45.5	6.3
Average Weekly Out-of-Pocket Cost of Care	$3.26	$7.44	-$4.19***	$7.52	$6.02	$1.50
Received a Child Care Subsidy***	28.9	35.4	-6.5	31.0	23.4	7.6
Child Was in Care at 12 Months of Age***	65.9	53.8	12.2**	65.8	50.5	15.3***
Child Was in Care at 24 Months of Age***	59.8	50.6	9.2	69.1	51.9	17.2***
Case Management						
Any Case Management Meetings***	95.5	63.3	32.2***	90.2	53.0	37.2***
Weekly Case Management, 1st Follow-Up Period***	61.4	9.6	51.8***	61.7	6.3	55.4***
Weekly Case Management, 2nd Follow-Up Period***	46.4	8.6	37.8***	48.0	4.4	43.7***
Weekly Case Management, 3rd Follow-Up Period***	34.0	11.1	22.9***	40.5	2.6	37.9***
Group Activities						
Any Group Parenting Activities***	75.0	41.6	33.4***	73.7	36.0	37.6***
Any Parent-Child Group Activities**	43.0	17.7	25.3***	42.3	16.8	25.5***

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TABLE VII.19 *(continued)*

	Mother at Risk of Depression (CES-D >= 16)				Mother Not at Risk of Depression (CES-D < 16)		
	Program Group	Control Group	Impact Estimate per Eligible Applicant		Program Group	Control Group	Impact Estimate per Eligible Applicant
Early Intervention Services							
Identification of Child's Disability***	9.1	8.0	1.1		2.4	3.6	-1.1
Services for Child With Disability***	6.5	3.7	2.8		1.7	2.3	-0.6
Child Health Services							
Any Child Health Services[c]	100.0	100.0	0.0		100.0	100.0	0.0
Any Doctor Visits***	100.0	98.7	1.4		100.0	100.0	0.0
Any Emergency Room Visits***	57.0	58.0	-1.0		60.8	48.3	12.5**
Number of Emergency Room Visits for Injuries	0.3	0.3	0.0		0.3	0.3	0.0
Any Dentist Visits***	23.9	26.8	-2.9		28.2	24.1	4.1
Any Screening Tests***	60.2	62.7	-2.4		60.2	66.1	-5.9
Any Immunizations***	99.5	97.8	1.8		99.5	98.1	1.4
Family Development Services							
Any Education-Related Services***	89.3	64.6	24.7***		89.3	54.5	34.8***
Any Employment-Related Services***	82.1	54.9	27.2***		82.1	38.3	43.8***
Any Family Health Services[c]	100.0	100.0	0.0		100.0	100.0	0.0
Any Family Mental Health Services***	32.1	36.4	-4.3		22.3	20.7	1.5
Transportation Assistance***	43.0	33.9	9.1*		31.4	23.5	7.9*
Housing Assistance***	68.8	66.2	2.6		56.6	50.8	5.8
Sample Size	**228**	**222**	**450**		**239**	**216**	**455**

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroups are included in the estimates for each subgroup.

[a] Home visits, case management, center-based child care, and/or group parenting activities.

[b] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups in the first two columns.

[c] There is no variance across subgroups due to lack of variance in level of services.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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TABLE VII.20

IMPACTS ON CHILD AND FAMILY OUTCOMES AT AGE 3, BY MOTHER'S RISK OF DEPRESSION AT ENROLLMENT

	Mother at Risk of Depression (CES-D >= 16)				Mother Not at Risk of Depression (CES-D < 16)			
Outcome	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c
Child Cognitive and Language Development								
Bayley Mental Development Index (MDI) Standard Score	92.6	92.4	0.2	1.8	93.5	95.0	-1.5	-11.8
Percentage with MDI < 85***^{d}	21.4	24.8	-3.5	-7.5	23.4	21.3	2.0	4.4
Peabody Picture Vocabulary Test (PPVT)-III Standard Score*	83.3	85.2	-1.9	-11.8	88.3	85.5	2.8	17.4
Percentage with PPVT-III < 85***	48.7	47.4	1.3	2.5	33.9	48.3	-14.4**	-28.9
Child Social-Emotional Development								
Engagement of Parent During Parent-Child Semistructured Play	5.0	4.6	0.4***	35.2	4.9	4.8	0.1	13.5
Sustained Attention with Objects During Parent-Child Semistructured Play	5.2	4.8	0.4***	37.4	5.1	4.9	0.2*	21.5
Engagement of Parent During Parent-Child Puzzle Challenge Task**	5.1	4.8	0.3***	32.5	5.1	5.1	-0.0	-2.4
Persistence During Parent-Child Puzzle Challenge Task	4.7	4.5	0.3*	21.2	4.7	4.7	-0.0	-1.5
Bayley Behavioral Rating Scale (BRS): Emotional Regulation	3.9	4.0	-0.1	-13.0	4.0	4.1	-0.1	-10.6
Bayley BRS: Orientation/ Engagement	3.9	3.9	0.0	5.7	4.0	4.0	-0.1	-10.4
Negativity Toward Parent During Parent-Child Semistructured Play	1.2	1.4	-0.2**	-29.6	1.2	1.3	-0.1	-13.7
Frustration During Parent-Child Puzzle Challenge Task	2.7	2.6	0.1	6.1	2.9	3.0	-0.1	-7.4
Child Behavior Checklist—Aggressive Behavior	12.6	12.3	0.3	3.9	9.9	10.1	-0.2	-3.3
Child Health Status								
Child's Health Status	4.0	4.2	-0.2	-16.6	4.1	4.3	-0.1	-13.4
Percentage of Children in Fair or Poor Health***	7.7	6.5	1.2	4.2	6.6	5.2	1.4	5.0
Quality of the Home Environment and Parenting: Overall and Physical Environment								
Home Observation for Measurement of the Environment (HOME) Total Score	27.6	28.0	-0.4	-7.8	28.4	28.1	0.4	7.1
HOME Internal Physical Environment	7.6	7.9	-0.2	-15.5	7.9	7.9	0.1	3.6
Parenting Behavior: Emotional Support								
HOME Warmth	2.5	2.5	0.0	4.4	2.5	2.5	0.0	2.1
Supportiveness During Parent-Child Semistructured Play	4.2	3.9	0.3**	26.8	4.1	4.1	-0.1	-0.3
Supportive Presence During Parent-Child Puzzle Challenge Task	4.6	4.6	0.1	6.4	4.6	4.6	0.1	3.5
Parenting Behavior: Stimulation of Language and Learning								
Percentage of Children with a Regular Bedtime***	58.5	59.8	-1.3	-2.7	66.7	66.0	0.7	1.3
Percentage of Children Who Follow a Bedtime Routine***	75.5	64.1	11.4**	24.6	73.0	76.2	-3.2	-6.9
HOME: Support of Language and Learning	10.8	11.0	-0.2	-9.8	11.0	10.9	0.2	7.6
Parent-Child Play	4.5	4.4	0.1	10.6	4.4	4.4	-0.0	-1.2
Quality of Assistance During Parent-Child Puzzle Challenge Task	3.8	3.7	0.1	9.2	3.8	3.6	0.2	16.7
Percentage of Parents Who Read to Child Daily***	55.6	59.3	-3.8	-7.5	66.9	55.4	11.5**	23.1

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TABLE VII.20 (*continued*)

	Mother at Risk of Depression (CES-D >= 16)				Mother Not at Risk of Depression (CES-D < 16)			
Outcome	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c
Percentage of Parents Who Read to Child at Bedtime***	39.8	31.5	8.3	18.2	39.1	37.4	1.7	3.7
Parenting Behavior: Negative Parenting Behavior								
Detachment During Parent-Child Semistructured Play**	1.2	1.4	-0.2**	-27.3	1.3	1.2	0.1	15.4
Intrusiveness During Parent-Child Semistructured Play	1.5	1.5	-0.0	-1.6	1.5	1.5	-0.0	-1.4
Detachment During Parent-Child Puzzle Challenge Task	1.6	1.7	-0.1	-9.6	1.8	1.7	0.1	5.9
Intrusiveness During Parent-Child Puzzle Challenge Task*	2.5	2.7	-0.2	-19.0	2.6	2.4	0.1	10.2
Negative Regard During Parent-Child Semistructured Play***	1.2	1.4	-0.2**	-26.7	1.4	1.2	0.2**	25.1
HOME Harshness	0.3	0.4	-0.1	-12.7	0.3	0.3	-0.0	-5.8
Percentage of Parents Who Spanked Child in the Past Week***	42.1	54.3	-12.2**	-24.5	39.0	47.2	-8.2	-16.3
Knowledge of Safety Practices and Discipline Strategies								
Percentage of Parents Who Usually Use a Car Seat Correctly***	71.5	70.7	0.8	1.7	78.2	70.9	7.3	15.8
Percentage of Parents Suggesting Physical Punishment as a Discipline Strategy***	38.1	42.9	-4.8	-9.6	31.4	39.6	-8.2*	-16.4
Percentage of Parents Who Would Use Mild Discipline Only***	55.9	48.2	7.7	15.7	55.5	51.0	4.5	9.2
Index of Severity of Discipline Strategies	3.0	3.3	-0.3*	-17.7	2.9	3.2	-0.3	-15.3
Parent Physical and Mental Health								
Parent's Health Status	3.2	3.5	-0.3**	-26.8	3.6	3.7	-0.1	-10.9
Parenting Stress Index (PSI) Parental Distress	27.0	26.7	0.4	4.1	22.5	23.4	-0.9	-9.7
PSI Parent-Child Dysfunctional Interaction	19.2	17.9	1.3*	20.5	17.0	16.1	0.9	14.5
Center for Epidemiological Studies Depression (CES-D; Short Form)	9.6	10.9	-1.3*	-18.0	6.1	6.7	-0.6	-7.9
CES-D Severe Depressive Symptoms ***	25.5	29.1	-3.6	-10.0	6.6	9.6	-3.1	-8.5
Family Environment Scale (FES): Family Conflict	1.7	1.7	0.0	4.8	1.6	1.6	-0.1	-9.7
Father Presence								
Currently Married To Biological Father ***	31.1	31.0	0.2	0.3	39.6	43.3	-3.7	-7.5
Biological Father is Currently Married to, Lives with, or is Boyfriend of Respondent***	45.2	39.9	5.3	10.6	49.5	57.1	-7.6	-15.2
Biological Father Currently Present in Child's Life***	69.6	65.3	4.3	9.5	71.4	76.6	-5.3	-11.8
Continuous Biological Father Presence Child Age 14-36 Months***	68.2	63.8	4.3	9.4	64.9	78.0	-13.2**	-28.7
No Biological Father Presence Child Age 14-36 Months***	12.5	10.6	1.9	6.0	18.1	10.3	7.8*	25.0
Continuous Male Presence Child Age 14-36 Months***	77.4	82.4	-4.9	-13.8	81.6	85.2	-3.6	-10.1
No Male Presence Child Age 14-36 Months***	3.1	0.3	2.7	22.6	3.6	1.5	2.1	17.3

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TABLE VII.20 (*continued*)

	Mother at Risk of Depression (CES-D >= 16)				Mother Not at Risk of Depression (CES-D < 16)			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Sample Size								
Bayley	174	175	349		200	175	375	
Parent Interview	236	217	453		258	232	490	
Parent-Child Interactions	183	170	353		196	178	374	

SOURCE: Parent interviews, child assessments, interviewer observations, and assessments of eemistructured parent-child interactions conducted when children were approximately 36 months old.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE VII.21

IMPACTS ON SELF-SUFFICIENCY AT 28 MONTHS, BY MOTHER'S RISK OF DEPRESSION AT ENROLLMENT

	Mother at Risk of Depression (CES-D >= 16)				Mother Not at Risk of Depression (CES-D < 16)			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Education/Job Training								
Ever in Education or Training***[d]	57.7	54.0	3.7	7.4	63.8	45.9	17.9***	35.7
Ever in High School***	7.5	4.5	3.0	10.5	9.3	7.3	2.0	7.0
Ever in ESL Class***	1.6	2.7	-1.0	-7.2	4.9	3.3	1.6	11.0
Ever in Vocational Program***	23.5	16.5	6.9	18.4	22.8	15.1	7.6*	20.3
Average Hours per Week in Education or Training	3.7	2.4	1.3*	20.4	3.7	3.4	0.3	5.3
In Education or Training:								
1st Quarter***	22.8	20.9	1.8	4.5	25.7	19.3	6.4	15.5
2nd Quarter***	27.2	24.8	2.4	5.6	26.1	23.9	2.2	5.1
3rd Quarter***	29.2	26.3	2.9	6.6	29.0	24.5	4.4	10.0
4th Quarter***	29.6	24.1	5.5	12.9	30.3	22.1	8.2*	19.2
5th Quarter***	27.7	22.7	5.1	11.7	31.4	24.4	7.0*	16.4
6th Quarter***	25.8	19.3	6.5	15.7	28.2	23.8	4.4	10.5
7th Quarter*	23.5	18.9	4.6	11.6	23.9	19.4	4.5	11.3
8th Quarter***	23.0	20.3	2.7	6.8	26.6	18.1	8.5*	21.8
Have High School Diploma***	56.1	53.4	2.7	5.3	56.3	53.3	3.0	5.9
Have GED***	11.1	13.8	-2.8	-8.7	13.0	12.0	1.1	3.3
Employment								
Ever Employed***	87.3	85.5	1.7	4.6	88.4	83.1	5.3	14.2
Average Hours/Week Employed	16.6	17.7	-1.1	-7.5	17.4	15.4	2.0	13.7
Employed in:								
1st Quarter***	37.0	40.1	-3.1	-6.3	44.2	38.7	5.5	11.3
2nd Quarter***	43.2	49.7	-6.5	-13.0	53.2	44.9	8.4*	16.8
3rd Quarter***	51.7	55.5	-3.8	-7.6	61.4	54.2	7.2	14.3
4th Quarter***	58.2	55.4	2.8	5.7	64.3	56.6	7.7	15.4
5th Quarter	64.4	59.2	5.3	10.7	65.2	60.0	5.2	10.6
6th Quarter***	63.0	61.9	1.2	2.3	70.6	60.1	10.4**	21.2
7th Quarter***	60.9	57.0	3.9	7.9	63.4	50.9	12.5**	25.2
8th Quarter***	64.2	60.6	3.5	7.3	65.8	57.4	8.5	17.3
Any Self-Sufficiency-Oriented Activity (Education, Training, or Employment)								
Ever Employed or in Education/Training***	93.9	92.5	1.4	4.4	95.0	88.1	6.9**	22.9
Average Hours per Week in Any Activity	20.9	19.9	1.0	6.4	21.1	19.1	2.0	12.8
In Activities in:								
1st Quarter***	53.2	49.5	3.7	7.4	57.5	49.7	7.8*	15.5
2nd Quarter***	59.4	59.3	0.1	0.2	66.1	56.6	9.5**	19.3
3rd Quarter***	68.0	68.3	-0.4	-0.7	72.0	66.1	5.9	12.5
4th Quarter***	74.0	65.7	8.2*	17.3	74.6	64.3	10.3**	21.5
5th Quarter***	76.0	68.6	7.4*	16.0	74.2	68.8	5.4	11.7
6th Quarter***	74.4	68.9	5.5	11.7	78.9	70.5	8.4*	17.9
7th Quarter***	68.9	67.9	1.0	2.1	72.8	59.1	13.7***	28.6
8th Quarter***	72.1	69.0	3.1	6.6	74.0	64.2	9.8**	21.1

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TABLE VII.27 *(continued)*

	Mother at Risk of Depression (CES-D >= 16)				Mother Not at Risk of Depression (CES-D < 16)			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
AFDC/TANF Receipt								
Ever Received AFDC/TANF***	57.9	54.4	3.5	7.0	42.7	40.5	2.3	4.6
Received AFDC/TANF in:								
1st Quarter***	45.1	40.4	4.7	10.1	30.5	30.5	-0.0	-0.0
2nd Quarter***	46.1	42.3	3.8	8.0	31.5	32.1	-0.6	-1.2
3rd Quarter***	49.0	40.4	8.6**	18.0	33.1	32.6	0.4	0.9
4th Quarter***	38.8	33.6	5.2	11.2	26.5	28.9	-2.4	-5.3
5th Quarter***	36.9	34.2	2.7	5.9	25.2	27.3	-2.1	-4.6
6th Quarter***	34.8	32.5	2.4	5.1	22.9	30.2	-7.4*	-15.9
7th Quarter***	26.7	27.4	-0.7	-1.6	19.3	20.5	-1.2	-2.7
8th Quarter***	22.7	25.6	-2.9	-6.9	17.3	19.0	-1.7	-4.0
Total AFDC/TANF Benefits ($)	$2,834	$2,762	$73	1.9	$2,063	$1,807	$256	6.6
Receipt of Other Welfare Benefits$								
Ever Received Welfare***	76.1	71.3	4.8	10.3	64.2	63.1	1.2	2.5
Total Welfare Benefits ($)	$5,921	$5,329	$592	7.8	$5,153	$4,997	$156	2.1
Ever Received Food Stamps***	71.3	66.4	4.9	10.0	55.9	56.2	-0.4	-0.7
Total Food Stamp Benefits ($)	$2,630	$2,552	$77	2.8	$1,956	$1,850	$107	3.9
Income/Poverty								
Income Above Poverty Level***	37.4	41.6	-4.2	-8.4	45.4	48.2	-2.8	-5.6
Subsequent Births								
Subsequent Birth by 24 Months after Random Assignment***	21.3	26.7	-5.3	-11.9	23.2	29.3	-6.1	-13.5
Sample Size	**228**	**222**	**450**		**239**	**216**	**455**	

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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VIII. SUMMARY AND RECOMMENDATIONS

Using a rigorous, random-assignment research design, the national Early Head Start Research and Evaluation project documented the impacts of the 17 purposively selected programs on families and children at ages 2 and 3. In this chapter we summarize the key evaluation findings and draw lessons for programs, policymakers, and researchers.

A. KEY FINDINGS FROM THE ANALYSIS OF EARLY HEAD START IMPACTS

Early Head Start is making a difference for low-income families with infants and toddlers. By the time children's eligibility for Early Head Start ends at age 3, programs stimulated better outcomes along a broad array of dimensions with children, parents, and their home environments. Some of the outcomes that the programs improved are important predictors of later school achievement.

- For 3-year-old children, the Early Head Start research programs largely sustained the statistically significant, positive impacts on cognitive and language development that had been found at age 2. Early Head Start children were significantly less likely than control-group children to score in the at-risk range of developmental functioning in these areas. As previous research suggests, by moving children out of the lowest-functioning group, Early Head Start may be reducing their risk of poor cognitive and language outcomes later on.
- The programs had favorable impacts on more aspects of social-emotional development at age 3 than at age 2. At age 3, Early Head Start children engaged their parents more, were less negative to their parents, and were more attentive to objects during play than were control children. Early Head Start children also were rated lower in aggressive behavior by their parents than control children.
- When children were 3, the Early Head Start programs continued to have significant favorable impacts on a wide range of parenting outcomes. Early Head Start parents were observed to be more emotionally supportive and to provide more support for language and learning than control-group parents (for example, they were more likely to read to their children daily). They were also less likely than control-group parents to engage in negative parenting behaviors. Early Head Start parents were less likely to report that they spanked their child in the past week, and they reported greater knowledge of mild discipline strategies.

- Fathers whose children were enrolled in Early Head Start were significantly more likely than fathers and father figures from control-group families to participate in program-related child development activities, such as home visits, parenting classes, and meetings for fathers. Although providing services specifically to fathers is relatively new for Early Head Start programs (in comparison to their history of serving mothers and children), the programs had significant favorable impacts in several areas of fathering and father-child interactions.
- The Early Head Start programs had several important impacts on parents' progress toward self-sufficiency. The positive impacts on participation in education and job training activities continued through 26 months following enrollment, and some impacts on employment began emerging late in the study period in some subgroups. These impacts did not result in significant improvements in income during this period, however.
- Early Head Start mothers were somewhat less likely to experience subsequent births during the first two years after they enrolled and may therefore have been less likely to experience the economic and psychological consequences of closely spaced births.
- The program impacts on children and parents in some subgroups of programs were larger than those in other subgroups. The subgroups in which the impacts were relatively large (with effect sizes in the 20 to 50 percent range across multiple outcomes) included mixed-approach programs, African American families, mothers who enrolled during pregnancy, and families with a moderately high (vs. a low or very high) number of demographic risk factors. In a few subgroups, the programs produced few significant favorable impacts. Knowledge of these variations in impacts across subgroups can be used to guide program improvement efforts.

The consistent pattern of statistically significant, favorable impacts across a wide range of outcomes when children were 2 and 3 years old, with larger impacts in some subgroups, is promising. Most impacts were modest (with effect sizes in the 10 to 20 percent range), but the wide range of impacts on both children and parents suggests that Early Head Start programs may be improving the balance of risk and protective factors in the lives of the low-income families they serve. Whether this broad range of modest impacts that have been sustained through toddlerhood will continue through childhood is unknown. However, the overall pattern of findings—modest impacts on a wide range of child and parent outcomes that were sustained until age 3—suggests that the programs are building assets in children and families that may well continue to facilitate positive outcomes later on. Also, the program impacts on children and parents in some subgroups of families and programs were considerably larger than the overall impacts (effect sizes ranging from 20 to 50 percent), suggesting that for some children and families, the potential longer-term impacts may be larger. This was true both for program subgroups (mixed-approach programs, especially those that were fully implemented early) and family subgroups (particularly, mothers who enrolled during pregnancy, African American families, and families with a moderate number of demographic risk factors).

Early Head Start programs took both direct (providing services to children directly) and indirect (providing services through parents) pathways to accomplishing their goals. Consistent with many programs' theories of change, we found evidence that the programs' impacts on parenting when children were 2 years old were associated with impacts on children when they were 3 years old. For example, higher scores on the cognitive development measure at age 3 were associated with higher levels of parent supportiveness in play and greater support for cognitive and language development when the children were 2; similarly, lower levels of aggressive behavior when children were 3 were related to greater parental warmth and lower levels of spanking when the children were 2 years old.

The programs' impacts on child and family outcomes were also consistent with the finding that programs substantially increased their families' receipt of services relative to control families. Given the voluntary nature of the Early Head Start program, participation levels ranged from no participation to intensive participation throughout the evaluation period. Overall participation rates, however, were high during the first 28 months after enrollment. Furthermore, a high percentage of program families received intensive services, a reflection of the substantial efforts of program staff to engage families in ongoing services. On average, program families participated in Early Head Start for 21 months. These high levels of participation are reflected in large impacts on service receipt. Although other services were available in the Early Head Start communities, and although many control group families received some services, Early Head Start families were, during the first 28 months after random assignment, significantly more likely to receive a wide variety of services, much more likely to receive intensive services, and much more likely to receive intensive services that focused on child development and parenting.

Implementing key services in accordance with the Head Start Program Performance Standards for quality and comprehensiveness appears to be important to success. When children were 2, programs that had fully implemented key elements of the Head Start Program Performance Standards early had a stronger pattern of impacts than programs that reached full implementation of the standards later or not at all during the evaluation period. The differences in impacts on children and parenting among programs that fully implemented the standards early, later, or incompletely became less distinct by the 3-year assessment point, when all three groups of programs had some important impacts. Nevertheless, the findings show that:

- Programs that were fully implemented (whether early or late) produced a broader range of impacts at age 3 than the incomplete implementers.
- Although it is not possible to fully disentangle the effects of program approach and implementation pattern, there is evidence that reaching full implementation contributes to a stronger pattern of impacts. Mixed-approach programs that were fully implemented early demonstrated a stronger pattern of impacts (and some of the largest impacts detected in the study) than those that were implemented later or not at all. Home-based programs that were fully implemented early or later demonstrated impacts on some important outcomes that other home-based programs did not have.

All program approaches for delivering services produced impacts on child and parent outcomes. Programs chose their service approach based on their understanding of local family needs, their philosophies of best practice, and the resources available. This may partially explain findings showing that programs selecting different approaches had different patterns of outcomes:

- The center-based programs, which had the greatest impacts on receipt of center-based child care and the amount of child care received, consistently enhanced cognitive development and, by age 3, reduced negative aspects of children's social-emotional development. The programs also demonstrated favorable impacts on several parenting outcomes, but had few impacts on participation in self-sufficiency-oriented activities.

- The home-based programs, which had the greatest impacts on receipt of home visits, case management, and parent-child group activities, had favorable impacts on language development at age 2, but not at age 3. They had a favorable impact on children's engagement of their parents in semistructured play interactions at age 3. Only a few impacts on parents were significant, but parents in home-based programs reported less parenting stress than their control group did. Implementing home-based programs was challenging. Nevertheless, those that reached full implementation by fall 1999 had a stronger pattern of impacts. When the children were 3, the fully implemented programs had significant favorable impacts on cognitive and language development that have not generally been found in evaluations of home-visiting programs.

- Programs that offered both home-based and center-based options in response to local families' needs (the mixed-approach programs) had more flexibility in serving individual families, were able to keep them engaged in services longer on average, and had a pattern of stronger impacts on children and families. The mixed-approach programs consistently enhanced children's language development and aspects of social-emotional development. These programs also had consistent significant favorable impacts on a wider range of parenting behavior and participation in self-sufficiency-oriented activities. The mixed-approach programs that became fully implemented early had a particularly strong pattern of impacts. The stronger pattern of impacts among mixed-approach programs may reflect the benefits of families receiving both home-based and center-based services, the value of programs' flexibility to fit services to family needs, or the fact that these programs were able to keep families enrolled somewhat longer.

The impacts of the Early Head Start research programs were broad. The programs reached all types of families with child development services and provided them with a significantly greater number of services, and services that were more intensive than families would have received in their communities without the benefit of Early Head Start. By age 3, most subgroups of children benefited in some way from participating in Early Head Start. Similarly, most subgroups of parents benefited in some way related to their parenting. The programs also helped parents in most subgroups work toward self-sufficiency.

Analyses of program impacts on subgroups of children and families also suggest:

- Earlier intervention is better. The 17 Early Head Start research programs appear to have been more effective in improving child outcomes in families that enrolled before their child was born than in families that enrolled after their child was born (some effect sizes were as large as 50 percent). However, children who were born after enrollment also benefited from the program, and program impacts on parenting were similar across these groups.

- Both firstborn and later-born children and their families benefited from participating in Early Head Start, although the pattern of impacts differed between these groups. The programs had significant favorable impacts on child development and parenting in both groups of families. Early Head start consistently increased the participation in education of parents of firstborn children, however, and reduced the proportion who had another baby during the first two years after enrollment.

- Early Head Start appears to have provided a foundation of support for children's development among families in which parents reported symptoms of depression when they enrolled, a group that other studies have found to be difficult to serve. Among parents at risk of depression in the eight research sites that measured depression at baseline, Early Head Start parents reported significantly less depression than control-group parents when children were 3. Early Head Start also demonstrated a favorable pattern of impacts on children's social-emotional development and parenting outcomes among these families.

- Early Head Start also appears to have provided support for children's development in families of teenage parents. Like other programs designed to increase self-sufficiency among disadvantaged teenage parents, the Early Head Start research programs succeeded in increasing school attendance among teenage parents. Unlike other large-scale programs, however, the programs also enhanced their children's development.

- Families with many demographic risks usually pose difficult challenges for early intervention and family support programs, and this was true for the Early Head Start research programs as well.[1] Program impacts on the families with more than 3 risks were unfavorable, although programs did significantly delay subsequent births in the group with more than 3 risks. Previous research suggests that low-income families who have experienced high levels of instability, change, and risk may be overwhelmed by changes that a new program introduces into their lives, even though the program is designed to help. As a result, the program requirements may create unintended negative consequences for these families. Because families with the most risks were more likely to be in home-based or mixed-approach programs that were not fully implemented early, it is possible that the staff turnover and disruptions in staff-family relationships experienced in some of these programs had an adverse effect on the most vulnerable families. Early Head Start had strong impacts, however, on families with a moderate number of demographic risks.

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[1] The demographic risk factors considered include (1) being a single parent, (2) receiving welfare cash assistance, (3) being neither employed nor in school or job training, (4) being a teenage parent, and (5) lacking a high school diploma or GED.

- The Early Head Start programs were especially effective in improving child development and parenting outcomes of the African American children and parents who participated, and they also had a favorable pattern of impacts on the Hispanic children and parents who participated. While many impacts on child development and parenting were favorable among white families, virtually none was statistically significant. The more-disadvantaged status of African American control group children and families relative to the control families in other racial/ethnic groups may have set the stage for the Early Head Start programs to make a larger difference in the lives of the African American children and parents they served. Early Head Start brought many of the outcomes of African American children and parents in the program group closer to the levels experienced by the other racial/ethnic groups.

B. RECOMMENDATIONS FOR PROGRAMS, POLICY, AND RESEARCH

The impact findings, taken together with findings from the study of program implementation (see *Pathways to Quality*), suggest several lessons for ***programs***. Several of the lessons pertain to program implementation:

- Fully implementing key elements of the Head Start Program Performance Standards is important for maximizing impacts on children and parents. The research programs that reached full implementation by fall 1999 had a stronger pattern of impacts on child and family outcomes than the programs that did not.

- If they offer center-based services, programs should seek ways to place greater emphasis on parenting, parent-child relationships, and family support, areas in which the center-based research programs did not have a strong pattern of impacts. They should also increase efforts to support language development and do even more than they are already doing to foster cognitive development.

- If programs offer home-based services, they should strive to deliver a greater intensity of services, including more frequent home visits, while also attending to children's cognitive development and encouraging and supporting center-based activities for children as they become older toddlers. As documented in the implementation study, delivering home visits at the required intensity was extremely challenging, and the pattern of impacts produced by the home-based research programs suggests that doing so is important.

Several lessons for programs emerge from the evaluation findings related to specific outcomes:

- To ensure the safety of infants and toddlers, programs (especially center-based ones) should be more vigilant about parental safety practices. The programs did not increase consistent, correct use of car seats among families.
- Greater access to services to address the mental health needs of parents, many of whom reported symptoms of depression and parenting stress, is needed. Although several subgroups demonstrated that favorable impacts on parent mental health outcomes are possible, we found no significant overall impacts on receipt of mental health services or on parent mental health outcomes.

Finally, several recommendations for programs pertain to which families they should seek to enroll and the timing of enrollment:

- Programs should enroll parents and children as early as possible, preferably before children are born. Although the programs improved outcomes among children who were enrolled after birth, the strongest pattern of impacts was achieved with children whose families enrolled during pregnancy.
- Programs should enroll parents at all stages of childbearing. The research programs had favorable impacts on both firstborn and later-born children and their parents.

The evaluation findings also have implications for ***policymakers***, including Head Start Bureau staff and policymakers concerned with programs and policies serving low-income families with young children:

- Early Head Start programs may provide support for children's development among families who may be struggling with their own needs. While increasing parents' participation in education and employment-oriented activities, the Early Head Start research programs had significant favorable impacts on children's development. These improvements occurred despite the fact that average family income did not increase significantly.
- Early Head Start programs may provide an effective way of serving some difficult-to-serve families. The research programs achieved favorable significant impacts among teenage parents and parents who reported depressive symptoms when they enrolled, including significant favorable impacts on children as well as parents.
- Like other early childhood programs, Early Head Start programs may have the greatest opportunity to improve outcomes among families with a moderate number of

demographic risks, but may have greater difficulty improving outcomes among families with young children who have four to five of the risk factors measured.

- This study validated the importance of meeting the Head Start Program Performance Standards for achieving impacts on children and parents, and it underscores the value of monitoring programs regularly. The performance standards may be useful as a guide to providing effective services in other early childhood and early intervention programs.
- The strong pattern of impacts among mixed-approach programs suggests that flexibility in service options for families may be valuable when community needs assessments show that both home-based and center-based services are needed.

Finally, the national Early Head Start Research and Evaluation project incorporated some innovative features into a large, multi-site evaluation, and the evaluation findings have implications for ***researchers:***

- Devoting significant resources to conceptualizing, documenting, and analyzing the implementation process and understanding as fully as possible the approaches (strategies and activities) that programs take in delivering services is critical for understanding program impacts and deriving lessons from them. *Pathways to Quality* (ACYF 2002) includes information on methods of rating implementation and defining program approaches that may be useful to researchers investigating similar topics in Early Head Start and other programs.
- Using multiple methods for measuring outcomes, so that findings are not dependent only on parent reports, child assessments, or any single methodology, increases the confidence that can be placed in the impact findings. The Early Head Start findings are based on a mixture of direct child assessments, direct observations of children's behavior by trained observers, ratings of videotaped parent-child interactions in standardized ways, ratings of children's behaviors by their parents, and parents' self-reports of their own behaviors, attitudes, and circumstances. Details of the measurement process in the Early Head Start evaluation can be found in Volume II, Appendix C.
- Identifying subgroups of programs and policy-relevant populations is valuable so that analyses can begin to address questions about what works for whom. Having adequate numbers of programs and adequate sample sizes within sites to make program-control comparisons of outcomes for particular subgroups of sites or subgroups of families can provide important insights into program impacts under particular conditions and for particular groups of families. Researchers do not always have the benefit of the large, multisite sample that was created for the Early Head Start national evaluation, but if questions about multiple approaches across multiple populations are of interest, every effort should be made to increase sample sizes and variability.

- Incorporating local perspectives in national evaluation studies enables the voices of programs and local researchers to supplement the cross-site analyses and enhance the interpretation of the national findings. In text boxes throughout this report, and in more in-depth write-ups in Volume III, it is possible to see the diversity of research at the local program level that can be brought to bear on a large number of developmental, programmatic, and policy questions.
- Partnerships with local programs were important to the success of the evaluation, and participating in the research enhanced local programs' continuous program improvement processes.

C. NEXT STEPS

More analyses are available in two special policy reports that provide additional findings related to children's health and child care. In addition, members of the Early Head Start Research Consortium are continuing to analyze national data, and local research partners are analyzing local data. Reports similar to those presented in Volume III will continue to appear in the coming months and years. Finally, ACF/ACYF are sponsoring a longitudinal follow-up study in which the children in the national sample at the 17 sites are being assessed, and their mothers and fathers interviewed, as they enter kindergarten. The follow-up study, which will be completed by 2004, will provide an opportunity to learn about the experiences of Early Head Start children and families after they leave the program.

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EARLY HEAD START®

RESEARCH

Making a Difference in the Lives of Infants and Toddlers and Their Families: The Impacts of Early Head Start

Volume II: Final Technical Report Appendixes

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Administration for Children and Families
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Making a Difference in the Lives of Infants and Toddlers and Their Families: The Impacts of Early Head Start

Volume II: Final Technical Report Appendixes

June 2002

Child Outcomes Research and Evaluation
Administration for Children and Families
And the Head Start Bureau
Administration on Children, Youth and Families
Department of Health and Human Services

Early Head Start Evaluation Reports

Leading the Way: Describes the characteristics and implementation levels of 17 Early Head Start programs in fall 1997, soon after they began serving families.

Executive Summary (December 2000): *Summarizes Volumes I, II, and III.*

Volume I (December 1999): *Cross-Site Perspectives—Describes the characteristics of Early Head Start research programs in fall 1997, across 17 sites.*

Volume II (December 1999): *Program Profiles—Presents the stories of each of the Early Head Start research programs.*

Volume III (December 2000): *Program Implementation—Describes and analyzes the extent to which the programs fully implemented, as specified in the Revised Head Start Program Performance Standards, as of fall 1997.*

Pathways to Quality and Full Implementation (spring 2002): *Describes and analyzes the characteristics, levels of implementation, and levels of quality of the 17 Early Head Start programs in fall 1999, three years into serving families. Presents an analysis of the pathways programs followed to achieve full implementation and high quality.*

Building Their Futures: How Early Head Start Programs Are Enhancing the Lives of Infants and Toddlers in Low-Income Families: *Presents analysis of the impacts that the research programs have had on children's development, parenting, and family development through 2 years of age.*

Summary Report (January 2001): *Synopsis of the major findings.*

Technical Report (June 2001): *Detailed findings and report on methodology and analytic approaches.*

Special Policy Report on Child Care in Early Head Start (summer 2002): *Describes the nature, types, and quality of child care arrangements in which Early Head Start and control group children enrolled, and presents implications for public policy.*

Special Policy Report on Children's Health in Early Head Start (summer 2002): *Describes health services received by Early Head Start and control group families.*

Making a Difference in the Lives of Infants and Toddlers and Their Families: The Impacts of Early Head Start (June 2002): *Presents analysis of the impacts that the research programs have had on children's development, parenting, and family development through the children's third birthday (including two to three years of program participation).*

Reports Are Available at:

http://www.acf.dhhs.gov/programs/core/ongoing_research/ehs/ehs_intro.html

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CONTENTS

Section		Page
Appendix A	ACKNOWLEDGMENTS	A.1
Appendix B	DATA COLLECTION, SOURCES OF NONRESPONSE, AND FATHER STUDY RESPONSE RATES	B.1
Appendix C	OUTCOME MEASURES, PSYCHOMETRICS, AND IMPLEMENTATION MEASURES	C.1
Appendix D	ANALYTIC ISSUES AND DETAILS	D.1
Appendix E	SUPPLEMENTAL TABLES BY CHAPTER	E.1

APPENDIX A

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This report is the culmination of more than six years' work by a very large number of people. Overall, the Early Head Start Research and Evaluation project could not have been undertaken without the contributions and collaboration of many, many individuals and organizations. In this appendix we acknowledge the diverse contributions of so many. We have attempted to include those who have played a key role from the beginning of the project, whether or not they were still involved at the time this report was being prepared; without their contributions, this work would not have been possible. We list the contributors that we so gratefully acknowledge in the following groups[1]:

- Early Head Start program directors at the 17 programs participating in the research
- Early Head Start local research teams
- Federal agency staff, including those at the Administration on Children, Youth and Families; the Administration for Children and Families; Office of the Assistant Secretary for Planning and Evaluation; and the National Institute of Child Health and Human Development
- Site Coordinators
- Xtria (formerly Ellsworth Associates)
- Early Head Start National Resource Center
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APPENDIX B

DATA COLLECTION, SOURCES OF NONRESPONSE, AND FATHER STUDY RESPONSE RATES

B.1 DATA COLLECTION

a. National and Local Research Roles

The national contractor team (MPR and Columbia) was responsible for all aspects of preparation for data collection, tracking of interview status, data entry, quality control, coding of interview responses, coding of parent-child interaction videotapes, and data analysis. Preparation for data collection included nominating evaluation measures, creating and distributing interviews, writing operations and training manuals, conducting centralized training sessions for staff from all 16 sites (2 programs were located in one city, so one research team conducted the data collection for both), certifying that data collectors met the quality and reliability standards set for each measure, providing assessment materials, and notifying local data collection teams when families were to be interviewed. MPR's tracking of interview status included requiring the local teams to send biweekly updates on the data collection status of families with open interview "windows," working with the sites to assist in locating hard-to-reach families, and conducting regular telephone meetings with the sites to review the biweekly reports.

In addition to conducting their own research, the local research teams were responsible for hiring a site coordinator as the key person to work with MPR on the cross-site data collection, hiring data collectors, locally supervising the data collection team, conducting all interviews and assessments, tracking interview status, and sending the data to MPR for processing. Sites decided how they staffed the data collection, and data collection team personnel varied, with some staff members working full-time and some part-time. We began with two data collection roles at each site: (1) interviewer/assessors (IAs) were hired with the primary responsibility of conducting the birthday-related parent interviews, child assessments, and parent-child videotaped assessments; (2) community/family coordinators (CFCs) were designated to conduct the follow-up parent services interviews using the Computer-Assisted Personal Interviewing (CAPI) technique. Individuals with a variety of experiences assumed data collector roles, including graduate students, professional interviewing staff, and members of the local community. In some sites the site coordinators collected data themselves, and in other sites they did not.

b. Interviewer Training, Certification, and Reliability

Interviewer Training. The national team conducted group training for local research staff members (site coordinators, CFCs, and IAs) who conducted the Parent Services Interviews (PSI), Parent Interviews (PI), and Child and Family Assessments. Training sessions for the 6-month PSI, the 14-month PI, and the 14-month Child and Family Assessments were conducted in August 1996 and during several smaller sessions throughout the first year of data collection to accommodate different data collection schedules at the sites, as well as to respond to staff turnover. Training sessions were approximately 3 days long for CFCs conducting the 6-month PSI, and 5 days long for IAs conducting the 14-month PI and the Child and Family Assessments. Site coordinators conducted all the 15- and 26-month PSI training locally. In July 1997, we conducted a four-day training session for the 24-month PI and Child and Family Assessments. Representatives from each site were required to attend. The site coordinators conducted all subsequent 24-month training locally. For all centralized training sessions, we asked CFCs and IAs to review the training manual prior to training and prepare to participate in group lectures and discussions, hands-on practice, and taping of practice administrations. All 36-month PI and Child and Family Assessment training was conducted at the local research sites by the site coordinators. MPR prepared training materials and videotapes and site coordinators worked with IAs to train staff and prepare them for certification.

Interviewer Certification and Reliability. After training, we required CFCs and IAs to conduct practice interviews and assessments and submit audiotapes or videotapes to the national team for certification. The mode of administration, initial certification requirements, and ongoing reliability procedures for each type of interview are described in this section.

- **Parent Services Interview.** CFCs conducted the PSIs by CAPI. Most of the interviews were conducted by telephone, but CFCs visited families in their homes if a telephone interview was not possible. CFCs were required to practice using CAPI with nonrespondents and conduct a mock interview with their site coordinator. The site coordinator reviewed the completed interview on the computer and sent an audiotape of the practice interview and the diskette containing the interview data to MPR for review. CFCs were certified to collect data from respondent families if the mock interview was administered correctly. If a CFC was not certified on their first attempt, we asked them to practice and conduct another mock interview until they met the certification requirements. After a CFC was certified, site coordinators monitored every fifth interview until the CFC reached her/his 25th. Beyond the 25th interview, site coordinators monitored one audiotaped interview every month and one live interview every 6 months.

- **Birthday-Related Measures.** IAs conducted the 14-, 24-, and 36-month PI and the family and child assessments (including the Bayley II, the parent-child videotaped assessments, the MacArthur CDI, PPVT-III, TVIP, and a modified version of the HOME) in the families' homes. Most of the birthday-related interviews and assessments were conducted in the homes, but if the parent was unable to conduct the interview and assessments in her/his home, the IA conducted the PI by telephone and tried to complete the assessments at a different time. The interviews and assessments were conducted using paper-and-pencil questionnaires.

  Bayley Scales. After the 14- and 24-month central training sessions and the 36-month local training, IAs were required to critique and score a videotaped Bayley administration and score a second administration to practice what they learned during training. A team of Bayley trainers and reviewers (expert consultants from New York University) provided feedback on the practice exercises. IAs were asked to practice the Bayley and the videotaped parent-child protocol with families who were not part of the evaluation.

  After a minimum of two practice administrations, IAs submitted a videotaped Bayley administration, a self-critique, the score sheet, and the completed behavior rating scale for review. The Bayley trainers and reviewers provided written feedback for two administrations per IA and determined whether the IA met our certification criteria of 85 percent reliability on administration and scoring. If an IA did not meet the certification criteria, he/she was asked to practice and resubmit. All IAs were required to meet the certification requirements before they collected data with study children. To ensure reliability of administration, IAs were required to videotape every 15th Bayley and submit it and a self-critique to MPR for review. Our Bayley trainers and reviewers found that most IAs met the certification criteria throughout data collection. If an IA did not, he/she was asked to review the feedback from the reviewer and conduct another Bayley with a child who was not part of the study.

Usually the IA did not require more than one practice administration to reestablish reliability for the Bayley administration and scoring.

Parent-Child Videotaped Assessments. After training and practice with at least two families who were not part of the evaluation, IAs were required to submit one videotape to MPR for review. A team of experts from MPR and Columbia reviewed the tapes and scored the interviewer on the administration of the protocol instructions, timing of the activities, and videography. IAs were certified to collect data with study families if they met the certification criteria established by the review team. If an IA did not meet the criteria, he/she was asked to submit another practice tape and self-critique for review. The review team provided feedback to IAs about the video protocol for approximately every 15th administration.

PPVT-III/TVIP. As part of the local 36-month training, IAs studied the PPVT-III and the TVIP. They completed practice scoring exercises and were asked to conduct practice administrations with adults and with children who were not part of the research. Site coordinators were asked to monitor practice administrations and determine whether the IA met the criteria for certification. MPR staff members reviewed the scoring for the first two administrations each IA completed and provided feedback as necessary.

Other Measures. As part of the field monitoring of the practice administrations of the PI, Bayley, and videotaped assessments, the site coordinators determined whether the IAs were certified on the PI, which included the MacArthur CDI (completed at 14 and 24 months by the parent as a self-administered questionnaire or administered by the interviewer according to the parent's preference) and the modified version of the HOME. To determine whether IAs were ready to conduct the interviews and assessments with study families, site coordinators were asked to assess the flow of the interview, transitions between components of the PI and the assessments, rapport with family and child, and completeness and accuracy of the interview and assessment documents.

- **Father Study Interview.** Twelve of the 17 research sites participated in the father study. Eleven of the sites conducted the 24- and 36-month father interview and one site conducted an abbreviated interview. The father interview was administered after the PI was completed with the child's primary caregiver. The primary caregiver (the mother in over 96 percent of the families) identified whether the biological father lived with the child or saw the child regularly. If the biological father did not live with the child, the IA determined whether there was a father figure. If the mother identified both an involved nonresident biological father and a father figure, the IA asked the mother which man was more involved with the child. If the mother did not object to having the father contacted, the IA reported to the site coordinator that there was an identified father and MPR began tracking the father as a respondent for the father study. In some sites, the same team of IAs conducted the father interviews and other sites hired new IAs. The site coordinator and certified IAs in each site conducted father interview training. Father study IAs were required to submit audiotapes of the father interview for review by the national team. Father study IAs had to meet the same certification and reliability standards as the IAs in the main study.

> ***Father-Child Videotaped Assessments.*** After training and practice with at least two fathers who were not part of the evaluation, IAs were required to submit one videotape to MPR for review. A team of experts from MPR and Columbia reviewed the tapes and scored the interviewer on the administration of the protocol instructions, timing of the activities, and videography. IAs were certified to collect data with study fathers if they met the certification criteria established by the review team. If an IA did not meet the criteria, he/she was asked to submit another practice tape and self-critique for review. The review team provided feedback to IAs about the video protocol for approximately every 15th administration.

Data collectors were not informed of families' program status; however, if families shared information that revealed their program status or kept Early Head Start materials in their homes, data collectors may have learned of some families' status by the time of the final assessments.

c. Data Collection Windows, Tracking, and Receipt Control

Data Collection Windows. Site coordinators were required to monitor the data collection window for each family for all the interviews and assessments. MPR generated contact sheets and advance letters for every family and sent them to the sites. The contact sheet included contact information for the family, the dates between which the interview was to be completed (the "window"), space to code the status of the interview, and space to record attempts to reach the family. All windows opened 4 weeks before the target date of the interview (targeted for 6, 15, and 26 months after random assignment for the PSIs, and the date of the child's 14-, 24-, and 36-month "birthday" for the birthday-related interviews and assessments). See Table B.1 for the target length of the windows by type of interview.

Timing of Interviews/Assessments by Child's Age and Months Since Random Assignment. Table B.2 gives a summary of the distribution of months between the target date and the completion of the 26-month PSI and the 36-month PI by research status. On average, the 26-month PSI was conducted about 28 months after random assignment, and the 36-month PI

TABLE B.1

EHS DATA COLLECTION WINDOW BY TYPE OF INTERVIEW/ASSESSMENT

Data Collection Instrument	Window
6-Month PSI (Parent Services Interview)	5 months to 11 months and 30 days
14-Month PI (Birthday Related Parent Interview)	13 months to 19 months and 30 days
14-Month Parent-Child Videotaped Assessments and Bayley	13 months to 16 months and 30 days
15-Month PSI	14 months to 22 months and 30 days
24-Month PI/Parent-Child Videotaped Assessments and Bayley	23 months to 28 months and 15 days
24-Month Father Interview/Father-Child Videotaped Assessments	23 months to 31 months and 30 days
26-Month PSI	25 months to 33 months and 30 days
36-Month Parent-Child Videotaped Assessments, Bayley, and PPVT-III	35 months to 38 months and 30 days
36-Month Father Interview/ Father-Child Videotaped Assessments	35 months to 43 months and 30 days

TABLE B.2

DISTRIBUTION OF THE NUMBER OF MONTHS BETWEEN INTERVIEW TARGET DATES AND COMPLETION OF KEY INTERVIEWS, BY RESEARCH STATUS

(Percentage)

	26-Month Parent Service Interviews			36-Month Parent Interviews		
Number of Months	Program Group	Control Group	Combined Sample	Program Group	Control Group	Combined Sample
–3 to –1	2.3	1.0	1.6	2.2	2.6	2.4
–1 to –.5	9.1	7.4	8.2	10.5	11.9	11.1
–.5 to 0	8.6	11.2	9.9	12.1	11.3	11.7
0 to .5	12.5	11.3	11.9	13.3	13.3	13.3
.5 to 1	9.6	9.9	9.7	10.2	11.7	10.9
1 to 2	16.4	16.3	16.3	19.8	16.6	18.3
2 to 3	9.3	12.1	10.7	15.6	15.6	15.6
3 to 4	6.9	8.2	7.6	8.1	7.7	7.9
4 or Greater	25.3	22.7	24.0	8.2	9.6	8.9
Average Number of Months	2.3	2.5	2.4	1.4	1.4	1.4

was conducted when the children were 37 months old (overall there were no differences by research status).

Tracking of Interview Cooperation Rates. When the interview window was open, MPR and the site coordinators worked together to develop strategies to increase interview completion rates. Site coordinators reported interview status to MPR and participated in phone meetings with MPR staff members to review data collection issues and update tracking information. For interviews that were difficult to complete or families that were hard to locate, the site coordinator requested assistance from MPR that included the search of locating data bases and telephone or, in some sites, field support from a trained MPR specialist in locating families.

Receipt Control. Completed birthday-related interviews and assessments were reviewed by site coordinators and any data edits were conducted at the site as necessary before the materials were sent to MPR. Site coordinators sent regular shipments to MPR of CAPI diskettes containing the PSIs, originals of the PI, and videotapes. MPR staff logged the materials into the tracking database and prepared the interview and assessment materials for data entry.

d. Data Processing, Data Entry, and Quality Control

Data Processing. MPR staff copied the parent-child videotapes and sent them to the Columbia University team for coding. MPR and the site coordinator compared logs of materials sent by the sites and received by MPR to ensure that all the data had been received. CAPI diskettes were downloaded and included in a database organized by a unique family identification number. To protect families, any documents that included both the family identification number and the family contact information were kept in locked files.

Data Entry and Quality Control. Prior to data entry, all paper-and-pencil instruments were reviewed by quality control staff for any problems with the skip logic and other interview administration errors. All paper-and-pencil instruments were data entered with 100 percent verification into data entry programs with prescribed ranges for each item. For the PSIs, automatic range checks and skip patterns were part of the CAPI programming to reduce data collection and data entry errors. For questions that required or provided an option for the parent to specify her/his response, we recoded responses or developed codes to classify responses and included them as additional values if 10 or more respondents gave the same answer.

B.2 SOURCES OF NONRESPONSE

All multisite evaluations of the size and complexity of Early Head Start face a variety of data collection and analytic challenges that affect the overall and site-level response rates. This study is no different. Overall response rates, response rates by site and by data source, and response rates by evaluation subgroups are presented and discussed in Chapter II. Here we describe the nature of the nonresponse.

The primary sources of nonresponse were refusals to participate and inability to locate the families. Overall for the 15-month PSI, 45 percent of the families who did not respond refused to participate, and 49 percent moved or could not be located (the remaining 6 percent included families for whom the interview window closed before the interview was completed. For the 24-month PI, 51 percent of the families who did not respond refused to participate, and 44 percent moved or could not be located (the remaining 5 percent included families for whom the interview window closed before the interview was completed). Overall for the 26-month PSI, 41 percent of the families who did not respond refused to participate, and 52 percent moved or could not be located (the remaining 7 percent included families for whom the interview window closed before the interview was completed). For the 36-month PI, 46 percent of the families who did not respond refused to participate, and 51 percent moved or could not be located (the remaining 3 percent included families for whom the interview window closed before the interview was completed).

In addition to these more typical sources of nonresponse, unfortunately 21 children died during the course of the study (12 children in the control group, and 9 in the Early Head Start group). Over half of the deaths were miscarriages or stillbirths and we do not have complete data on age and cause of death for the remaining children. Three children were adopted after random assignment. No further data collection was attempted with families of deceased or adopted children.

Site coordinators reported that the data collection was very challenging. From the beginning of the project, some site coordinators reported that some families had not understood what they were signing up for (related to the program, the research activities, or both), and some site coordinators reported that control group families refused participation in the study after they learned that they were not going to receive Early Head Start services.

Analysis of the categories of nonresponse by site showed that the center-based sites were more successful in completing interviews and assessments with Early Head Start families than they were with the control group families. One explanation for this is that the Early Head Start families were using center-based services and may have been easier for research and program staff members to contact. To some degree, the same pattern might have been expected across all the programs—if the local research team used all available leads, they may have been able to contact and successfully complete interviews with a larger proportion of the Early Head Start group than the control group. This was not true across all sites, and in a number of sites research teams completed a larger proportion of the interviews with control group families.

In general, the PI response rate establishes the maximum for the Bayley, PPVT-III, TVIP, and parent-child videotaped assessment response rates. This is because if an interview was not done, it was generally the case that the other assessments also were not done. In some sites, IAs completed the PI by telephone if the interview window was about to close or if the family moved away, rather than lose the entire data collection wave for the family. In those cases it was impossible to conduct the Bayley, PPVT-III, TVIP, and the parent-child videotaped assessments. Sites reported other data collection-related reasons for nonresponse on the Bayley, PPVT-III, TVIP, and the parent-child videotaped assessment, including child illness on the interview date, child refusal to participate in the Bayley or PPVT-III, TVIP, assessment or the videotaped assessments, parental refusal to participate in the videotaped assessments, and insufficient time during the visit to complete the assessments.

Some of the data that were collected could not be used because of technical problems or errors in administration of the assessment. Between 3 and 8 percent of the 1,854 24-month videotapes and between 2 and 3 percent of the 1,701 36-month videotapes sent to Columbia for coding could not be coded because of incorrect administration of the parent-child assessments, lack of video or sound, or other technical problems. Nine percent of the 1,950 24-month Bayley assessments and 7 percent of the 1,793 36-month assessments conducted could not be scored because of errors in administration of the test or the lack of a basal.

B.3 FATHER STUDY RESPONSE RATES

The father study data in this report are from interviews conducted with fathers or father figures of children in the program and control groups. As described above, the 12 father study sites recruited the men after the mothers identified them either as a resident biological, an involved nonresident biological, or a father figure. Here we report updated response rates using the complete sample of 24-month interviews as well as those for 36 months. Response rates at 24-months are slightly lower than were reported previously, because originally we reported only completed interviews that had been received from the sites. After the sites sent in the final cases, we were able to compute final response rates. Across the sites at 24 months, approximately 76 percent of interviewed mothers identified a father or father figure. Of those who were identified, we were able to interview 727, or 62 percent of them. At the 36-month interview, we also asked mothers to identify a father or father figure and for permission to interview him. Across sites, 73 percent of interviewed mothers identified a father or father figure, of whom 698, or 64 percent were interviewed. Father study sample sizes and response rates at 24 and 36 months, by site are included in Table B.3.

Father Interview Response Bias. We examined baseline characteristics of families that had a father or father figure interviewed at either 24 or 36 months, and those that did not. We examined the following characteristics (unless noted, all were in reference to the mothers' characteristics at baseline): teenage mother, race/ethnicity, education, living arrangement, primary occupation, and child's sex. In most cases, *t*-tests of the proportions of fathers interviewed and not interviewed at each point showed significant differences in baseline characteristics between families with and without interviewed fathers. At 24 months, there were no differences in the proportions of families with a teen mother or with a male child, but there were differences in race, education, living arrangement, and primary occupation. The families with fathers or father figures interviewed at 24 months were generally more advantaged compared to families without an interviewed fathers. Families with interviewed fathers were composed of higher proportions of whites and lower proportions of African Americans, lower proportions with less than a high school education, higher proportions who lived with a spouse and correspondingly lower proportions living alone, and higher proportions in the "other" occupational category (unemployed or out of the labor force by choice). Findings at 36 months were similar, with the families who had interviewed fathers having an even larger proportion of whites and fewer African Americans, lower proportions with less than a high school education and a greater percentage with some college, higher proportions living with spouses, and significantly more who were employed or in the "other" occupational categories at baseline. In

TABLE B.3

FATHER INTERVIEW SAMPLE SIZES AND RESPONSE RATES FOR PROGRAM AND CONTROL GROUPS, BY SITE

	Father Interviews			
Site	24-Month Sample Size	Response Rate (Percentage)	36-Month Sample Size	Response Rate (Percentage)
1	51	45	44	37
3	54	45	30	25
4	63	57	52	46
6	36	24	55	40
8	83	55	96	66
10	47	51	44	52
11	30	25	37	27
13	102	69	101	69
14	48	44	44	44
15	71	54	53	43
16	74	50	82	59
17	68	46	60	44
Total	**727**	**62**	**698**	**64**

[a] The response rate was calculated by using the number of fathers identified by mothers during the 24- or 36-month parent interviews as the denominator.

addition, compared to their proportion at baseline, there were significantly fewer fathers interviewed at 36 months from families with a teenage mother at baseline. It is necessary to be mindful of the systematic ways that families with interviewed fathers differ from the overall sample of program and control families. Therefore, findings about the interviewed group may not generalize to the larger group of fathers and father figures in families in the entire sample, nor to the population of families eligible for Early Head Start.

We examined baseline characteristics of families with interviewed fathers at 24 and 36 months, to assess the similarity of the Early Head Start and the control groups. We compared proportions of teenage mothers, race/ethnicity, primary occupation, education, living arrangements, and child's gender between program and control families with interviewed fathers at each period. At 24 months, there were a few differences in baseline characteristics between program and control groups. Specifically, the program group had lower proportions of teenage mothers, whites, living arrangements with other adults, and higher proportions living alone compared to the control group. By 36 months, among families with an interviewed father or father figure, the only statistically significant difference was for living arrangements, with program families more likely to have mothers who lived alone at baseline rather than with a spouse or other adults compared to the control group.

APPENDIX C

OUTCOME MEASURES, PSYCHOMETRICS, AND IMPLEMENTATION MEASURES

This appendix provides supplementary information on measures used in the national evaluation for the impact and implementation analyses. We include:

- C.1 Selection of Child and Family Measures, p. C.5
- C.2 Constructs Used in the Analysis: Psychometric Properties, p. C.7
- C.3 Construction of Timelines, p. C.33
- C.4 Tables of Nonmissing Values for Constructs, p. C.35
- C.5 Implementation Measures, p. C.41

C.1 SELECTION OF CHILD AND FAMILY MEASURES

Our approach to selecting child and family measures was based on several guiding principles:

- **Relevance to Intervention Goals and Key Hypotheses.** The measures we chose were concentrated in areas that are important for children and families, that the Early Head Start program seeks to influence, and for which we had strong hypotheses about the short-term effects of the program.

- **Appropriateness to Children's Age and Developmental Level.** Because developmental change is rapid during the early years that are the focus of the evaluation, the measures of child outcomes appropriate at this age tend to focus on relatively narrow age ranges. Thus, to measure a particular outcome at different ages, we often had to select different outcome measures. In addition, a relatively large proportion of children from economically disadvantaged families exhibit developmental lags. Therefore, we considered the developmental level, as well as the chronological age of the children when choosing measures.

- **Appropriateness for the Early Head Start Population.** Many of the families in the sample have low income and represent racial, ethnic, and linguistic minority groups. Therefore, our goal was to choose measures available in languages other than English and normed or used with samples that include a variety of ethnic groups and children from economically disadvantaged families. In addition, we chose measures used with parents to be appropriate to their expected reading and comprehension levels as well as their cultural backgrounds.

- **Adequate Psychometric Properties.** We chose measures with adequate reliability and validity for children from low-income families and for a number of racial and ethnic groups. In general we chose measures with a demonstrated internal consistency reliability (coefficient alpha) of .70 or higher (this level is generally accepted as an adequate demonstration of reliability).

- **Prior Use in Large-Scale Surveys and Intervention Evaluations.** To reduce measurement development efforts and increase comparability with other national studies and intervention evaluations, many of the measures we chose were used in other studies and had demonstrated ease of administration and adequate psychometric properties. When we decided to use a measure that had not been used before, we worked with the author of the measure to determine whether we would expect it to work well in a national study with the characteristics of our study population.

- **Low Cost and Burden.** The measures we chose had to be administered reliably by trained interviewers rather than require administration by an experienced clinician. We also chose measures that posed minimal burden on the parents and children.

The national team (MPR and Columbia) worked with the Early Head Start Research Consortium to nominate measures, modify existing measures as needed, create new measures as needed, and pretest the interviews and assessments with families and children similar to the Early Head Start study families. The measures and the variables constructed from them are briefly described in each chapter of this report. Psychometric properties of the measures are described in Appendix C.2. The father study measures and their psychometric properties are also described in Appendix C.2.

C.2 CONSTRUCTS USED IN THE ANALYSIS: PSYCHOMETRIC PROPERTIES

To be included in the impact analyses, constructed variables had to meet the following criteria:

- **Sufficient Data at the Item Level.** If an individual was missing 25 percent or more of the items that went into a constructed variable, we did not construct the variable for that individual and that individual was not included in the impact analysis of that variable. If the individual was missing fewer than 25 percent of the items needed for a constructed variable, we imputed values based on the mean of the nonmissing items. The proportion of scores that required imputation was fairly low—if a parent began a measure, they generally completed all of the items. We never imputed values for our direct child assessments (the Bayley, MacArthur, PPVT-III, and the TVIP) or our parent-child videotaped assessments.
- **Adequate Distribution of Scores.** For our constructed variables, we checked the mean, standard deviation, skewness, and kurtosis to determine whether the variables had a normal distribution and seemed to have a similar distribution to those found in other studies using the same measure. In general, we found that our distributions met the criteria for normality, with skewness and kurtosis levels within appropriate ranges. The distributions were similar to those found in other studies of low-income families. Our sample means and standard deviations were generally lower than the means found in child assessment norming samples and in studies using similar measures with a more nationally representative sample of children and families.
- **Adequate Internal Consistency Reliability.** After discussion within the consortium and consultation with outside experts, we decided to include measures with internal consistency reliability of .65 and above in our impact analyses.
- **Consistent Reliability across Major Race/Ethnicity Subgroups.** We examined internal consistency reliability across our three major race/ethnicity groups, white non-Hispanics, black non-Hispanics, and Hispanics, to determine whether our measures had similar levels of reliability across these groups.

To prepare our data for analysis, we first consulted the literature and either scored questionnaires and child assessments as they had been scored by the author of the measure or we used a scoring approach consistent with the current literature. For new measures or for measures which required additional data reduction, we conducted factor analyses as needed. We also coded the parent-child videotaped assessments and analyzed the ratings. The factor analysis and coding procedures are described below.

a. Factor Analysis Approach

We used exploratory factor analysis techniques with Varimax rotation to create variables from multi-item questionnaire and observational measures. All factor analyses were conducted using only nonmissing child- and parent-level data. We used the following criteria to judge the adequacy of our factor analysis results:

- Items within factors made sense conceptually
- The solution yielded internal consistency reliability (coefficient alpha) of .65 or greater within each factor
- The solution minimized the number of items with appreciable loadings (.35 and greater) on multiple factors
- The solution minimized the number of items that did not load appreciably on any factor

b. Coding of the Parent-Child and Father-Child Videotaped Interactions at 24 and 36 months and Variable Creation

All videotapes of the 24- and 36-month parent-child videotaped interactions were coded by staff at the Center for Children and Families, Columbia University, Teachers College. At 24 months, a 10-minute semistructured free play task and a 3-minute teaching task were administered. At 36 months, the play task and a 6-minute puzzle challenge task were administered. These four tasks were also administered and coded for the 24- and 36-month waves of the father study. All codes were blind to the research status of the families.

Free Play Task: 24 and 36 Months. The semistructured free play task was coded according to scales adapted from the NICHD Study of Early Child Care's Three Box coding scales (NICHD Early Child Care Research Network 1997, 1999; Owen 1992; Owen et al. 1993). Nine 7-point coding scales assessed child and parent behavior. The three child scales rated *engagement of parent* (extent to which child initiates and/or maintains interaction with parent);

sustained attention with objects (degree of child's involvement with toys in the three bags); and *negativity toward parent* (degree to which child shows anger or hostility toward parent).

The six parenting scales addressed *sensitivity* (the extent to which the parent takes the child's perspective, accurately perceives the child's signals, and promptly and appropriately responds to these signals); *positive regard* (demonstration of love, respect, admiration); *stimulation of cognitive development* (teaching, actively trying to expand the child's abilities); *detachment* (under-involvement and lack of awareness, attention, engagement); *intrusiveness* (over-involvement, over-control); and *negative regard* (discontent, anger, rejection). Box C.2A includes more information about the individual coding scales.

A trained coding team leader worked with a five- to six-member coding team to establish and maintain inter-rater reliability throughout the coding period. For the coding of the 24- and 36-month semistructured play assessment, inter-rater reliabilities on the nine 7-point scales between the team leader and coders were established to a criterion of 85 percent (exact or within one point agreement). Thereafter, the team conducted weekly inter-rater reliability checks on a randomly selected 15 percent of each coder's videotape assignment. In the main study sample, a total of 151 tapes (9 percent of the 1,782 codable tapes) at 24 months and 174 tapes (11 percent of the 1,660 codable tapes) at 36 months served as reliability tapes. Percent agreement (exact or within one point) averaged 93 percent across all reliability checks for all 24-month coders, with a range of 84 to 100 percent. Percent agreement averaged 94 percent for all 36-month coders, with a range of 86 to 100 percent. In the father study sample, 43 tapes (14 percent of the 318 codable tapes) at 24 months and 44 tapes (15 percent of the 303 codable tapes) at 36 months served as reliability tapes. Percent agreement (exact or within one point) averaged 94 percent for all 24-month coders, with a range of 85 to 100 percent. Percent agreement averaged 94 percent for all 36-month coders, with a range of 86 to 100 percent.

BOX C.2A

24- AND 36-MONTH CODING SCALES FOR THE PARENT-CHILD AND FATHER-CHILD SEMISTRUCTURED PLAY ASSESSMENTS

Child Scales

Engagement of Parent Reflects the extent to which the child shows, initiates, and/or maintains interaction with the parent. This may be expressed by approaching or orienting toward parent, establishing eye contact with parent, positively responding to parent's initiations, positive affect directed to parent, and/or engaging parent in play.

Sustained Attention Measures the degree to which the child is involved with the toys presented in the three bags. Indicators include the degree to which child "focuses in" when playing with an object and the extent to which child coordinates activities with several objects and/or explores different aspects of a toy.

Negativity toward Parent Reflects the degree to which child shows anger, hostility, or dislike toward parent. Expressions may be overt (for example, forcefully rejecting a toy offered by parent or pushing parent away) or covert (for example, hitting or throwing an object in response to parent's behavior).

Parent Scales

Sensitivity Measures the degree to which the parent observes and responds to the child's cues (gestures, expressions, and signals) during times of distress as well as non-distress. Key features include being child-centered, "tuning in" to the child, manifesting an awareness of child's needs, moods, interests, and capabilities, being flexible in supporting and responding to child's emerging need for autonomy, control, independence, and mastery even while enforcing necessary rules, regulations, and constraints.

Positive Regard Assesses the parent's expression of love, respect and/or admiration for the child. Key features include verbal praising of child's efforts and successes, words of encouragement or support, and nonverbal affect, the way in which parent watches child attentively and looks into the child's face.

Stimulation of Cognitive Development Measures the quality and quantity of the parent's effortful teaching to enhance child's perceptual, cognitive, and linguistic development. Key features include being aware of the child's developmental level, efforts to bring the child above that level, flexibility and timing of instructions or explanations, and use of complex and varied language.

Detachment Measures the parent's lack of awareness, attention, and engagement with the child. Key features include being inattentive, perfunctory, or cold when interacting with child or, at the higher levels, complete lack of attention to or interaction with child.

Intrusiveness Assesses the degree to which the parent exerts control over the child rather than acting in a way that recognizes and respects the validity of the child's perspective. Intrusive interactions are clearly adult-centered rather than the child-centered and involve imposing the parent's agenda on the child despite signals that a different activity, level or pace of interaction is needed.

Negative Regard Reflects the parent's expression of discontent with, anger toward, disapproval of, and/or rejection of the child. This may be expressed verbally (words of derogation or disregard toward child) or physically (parental roughness, grabbing, or hitting child).

NOTE: Scales are assessed on a seven-point scale, "1" indicating a very low incidence of the behavior and "7" indicating a very high incidence of the behavior. The 24- and 36-month scales were adapted by Christy Brady-Smith, Rebecca Fauth, Claudia O'Brien, Lisa Berlin, and Anne M. Ware and were based on the "Early Head Start 14-month Child-Parent Interaction Rating Scales for the Three Bag Assessment" (Ware, Brady, O'Brien, and Berlin 1998), the NICHD Study of Early Child Care 15-, 24-, and 36-month ratings of Parent-Child Interaction, and the "Manual for Coding Freeplay - Parenting Styles from the Newark Observational Study of the Teenage Parent Demonstration" (Brooks-Gunn et al. 1992).

We conducted preliminary analyses examining correlations among these scales, possible underlying factors, and internal consistency. Based on our analyses, we created a main study composite parenting score, "supportiveness" (coefficient alpha = .83 and .82 at 24 and 36 months, respectively), by computing the mean scores for parental sensitivity, cognitive stimulation, and positive regard, which were highly and significantly correlated (correlations ranged from .52 to .67 at 24 months and from .50 to .71 at 36 months).

The scales assessing parental insensitivity (detachment, intrusiveness, and negative regard) and the child scales (engagement of parent, sustained attention with objects, and negativity toward parent) were retained as individual scales. In the main study, the correlations among the three child scales were moderate to high (statistically significant correlations of .34 to .55 at 24 months and .27 to .63 at 36 months). The correlations among the four parenting scales were small to moderate and statistically significant (correlations of .11 to .40 at 24 months and .12 to .36 at 36 months), with the exception of supportiveness and detachment (correlation of -.56 and -.45, respectively) and intrusiveness and negative regard (correlation of .52 and .47, respectively).

We created the same supportiveness composite for the father study. In the father study, correlations indicated a strong relationship between the variables that make up the composite score of supportiveness (correlations ranged from .55 to .64 at 24 months and from .60 to .73 at 36 months). The internal consistency of supportiveness was .86 at both time points. The same scales used in the main study were retained in the father study. Correlations among the three child scales were moderate to high (statistically significant correlations of .26 to .58 at 24 months and .30 to .61 at 36 months), with the exception of sustained attention and negativity toward parent at 36 months (correlation of .14). The correlations among the four parenting scales were moderate (correlations of .31 to .49 at 24 months and .20 to .42 at 36 months), with the exception of negative regard and detachment, which were small (nonsignificant correlations of .17 and .06, respectively), and intrusiveness and detachment, which were not significant (correlation of .07 in both waves).

Teaching Task: 24 Months. The Teaching Task was administered and videotaped in the home at 24 months. This procedure was a modified version of the Nursing Child Assessment Teaching Scales (NCATS), in which the parent instructs the child in an unfamiliar play activity. The parent was asked to select, from two choices, a task that the child either could not do or that would be the harder task for the child. The tasks were either sorting blocks, or reading a picture book. Parents were instructed to explain the task to the child and give the child any necessary assistance. The total interaction lasted three minutes.

For the coding of the 24-month teaching task mother-child interactions, five coders were trained by a certified NCATS instructor during a three-day training course. Each coder was required to pass the NCATS certification in the weeks following the initial training. In addition, inter-rater reliabilities between a certified coding team leader and the NCATS-certified coding team were then established to a criterion of 85 percent (exact agreement) on the individual items from the 6 NCATS subscales. Thereafter, intermittent inter-rater reliability checks on a randomly selected 15 percent of each coder's videotape assignment were conducted. A total of 130 tapes (8 percent of the 1,687 codable tapes) served as reliability tapes. Percent agreement on NCATS subscales averaged 89 percent with a range from 84 to 95. Two of these certified coders also coded the videotapes of the father-child teaching interaction. Initial reliability on coding father-child interactions was achieved on 37 videotapes (12 percent of the 312 codable), with intermittent ongoing reliability checks as described above for the main study tapes. Percent agreement on NCATS subscales for father study tapes ranged from 89 percent to 97 percent (average of 93 percent).

Coding consisted of dichotomous (yes/no) ratings on each of 73 behaviors, including 50 parent behaviors and 23 child behaviors. The published coding system (Sumner and Spietz, 1994) groups these behaviors into six subscales. The four parent subscales include *sensitivity to cues* (caregiver's sensitive responses to child's cues), *response to child's distress* (caregiver's change of the task and/or comforting responses to a child exhibiting disengagement or distress), *social-emotional growth fostering* (positive affect and avoidance of negative responses to the child), and *cognitive growth fostering* (caregiver's instruction and modeling of the task). Child behaviors were coded in two subscales: *clarity of cues* (facial expressions and motor activity indicating child's response to the task situation), and *responsiveness to caregiver* (child's facial expressions, vocalizations, and other responses to caregiver).

Preliminary analyses of the internal consistency of these scales revealed that very few of the subscales had internal consistency that met the Early Head Start criterion for use as outcome variables in the analyses of program impacts (coefficient of alpha = .65 or greater). Alpha for the parent subscales ranged from .24 to .74. Extensive consultation with Kathryn Barnard of the University of Washington (and developer of the NCATS scales) explored several potential explanations for the pattern of alphas found in the Early Head Start sample, including the very detailed coding afforded by the use of videotapes (rather than live coding), a shorter time allotted for the teaching interaction in the Early Head Start administration, and a truncated choice of tasks used in the Early Head Start protocol. These discussions, along with extensive psychometric analysis of the data and recommendations from Kathryn Barnard, led us to focus impact analyses exclusively on the total score (including all 73 coded items; coefficient alpha = .66 for mother tapes; alpha = .68 for father tapes) and the parenting items, added together into a parent total score (coefficient alpha = .66 for mothers; .64 for fathers).

Puzzle Challenge Task: 36 Months. The puzzle task was administered and videotaped in the home at 36 months and is based on the work of Matas, Sroufe, and colleagues (Matas, Arend, & Sroufe, 1978; Sroufe, Egeland, & Kreutzer, 1990). The child is asked to solve up to three puzzles of increasing difficulty in 6 to 7 minutes. The parent is instructed to let the child work on the puzzles independently first and then give the child any help he or she may need. If the dyad takes more than four minutes to solve a puzzle, the assessor/interviewer asks them to move on to the next puzzle.

Seven 7-point scales were adapted from the Newark Observational Study of the Teenage Parent Demonstration (TPD; Brooks-Gunn, Liaw, Michael, & Zamsky, 1992; Spiker, Ferguson, & Brooks-Gunn, 1993) to assess child and parent behaviors during the puzzle task. In developing the Early Head Start scales, the TPD scales were condensed and examples were tailored to the Early Head Start puzzle task assessment. The three child scales rated *engagement of parent* (extent to which child initiates and/or maintains interaction with parent); *persistence* (degree to which child is goal-oriented, focused and motivated to complete the puzzles); and *frustration with task* (degree to which child shows anger or frustration with the puzzle task).

The four parenting scales rated *supportive presence* (the degree to which the parent provides emotional, physical, and affective support to the child during the task); *quality of assistance* (the quality of instrumental support and assistance the provided to the child); *intrusiveness* (over-involvement, over-control); and *detachment* (under-involvement and lack of awareness, attention, engagement). Box C.2B includes more information about the individual coding scales.

To train coders, a training videotape was developed containing exemplars of high, medium and low scoring interactions along each scale. Coders reached 85 percent agreement or higher with a "gold standard" before coding unique interactions. A randomly selected 15 to 20 percent of each coder's weekly tape assignments were used to check coders' ongoing reliability. In the main study sample, a total of 194 tapes (12 percent of the 1,639 codable tapes) served as reliability tapes. Percent agreement (exact or within one point) averaged 93 percent across for all 36-month puzzle task coders, with a range of 88 to 100 percent. In the father study sample, 55 tapes (18 percent of the 300 codable tapes) served as reliability tapes. Percent agreement (exact or within one point) averaged 97 percent for all coders, with a range of 90 to 100 percent.

In the main study, the correlation among child engagement and frustration with the task was not significant (correlation of -.05); correlations among the other child scales were moderate to high (statistically significant correlations of -.21 and .41). The correlations among the four parenting scales were moderate to high and statistically significant (correlations of -.27 to .59), with the exception of the correlation between intrusiveness and detachment, which was small but significant (correlation = .16).

In the father study, the correlation among child engagement and frustration with the task was small, but significant (correlation = -.13); correlations among the other child scales were moderate to high (statistically significant correlations of -.21 and .31). The correlations among the four parenting scales were moderate to high and statistically significant (correlations of .24 to .52).

BOX C.2B

36-MONTH CODING SCALES FOR THE PARENT-CHILD AND FATHER-CHILD PUZZLE CHALLENGE ASSESSMENTS

Child Scales

Engagement of Parent Reflects the extent to which the child shows, initiates, and/or maintains interaction with the parent and communicates positive regard and/or positive affect to the parent.

Persistence Measures how goal-oriented, focused and motivated the child remains toward the puzzle throughout the task, even in the face of frustration or boredom. The focus of persistence is on the child's apparent effort to solve the puzzle, not on how well the child performs.

Frustration with Task Measures the degree to which the child expresses frustration or anger toward the puzzle task. Expressions may be intense (for example, throwing the puzzle to the side or refusing to continue working on the puzzle) or subtle (for example, sighing, frowning, pushing a puzzle piece that will not fit).

Parent Scales

Supportive Presence Focuses on the parent's emotional availability and physical and affective presence during the puzzle task. Supportive presence involves providing a secure base from which the child can explore, and displaying emotional support and enthusiasm toward the child and his or her autonomous work.

Quality of Assistance Measures the instrumental support and assistance the parent offers the child during the puzzle task. Specifically, quality of assistance is the extent to which the parent helps the child by scaffolding the task to bring the child above his/her level of understanding and ability, and helping the child to think analytically. Key features include illustrating general cause and effect relationships within the puzzle and its related parts, and stimulating the child's perceptual, cognitive, and linguistic development, so that the child might be better able to solve a similar problem autonomously.

Intrusiveness Assesses the degree to which the parent controls the child rather than recognizing and respecting the validity of the child's independent efforts to solve the puzzle. Intrusive interactions are clearly adult-centered rather than child-centered and undermine the child's potential for understanding and solving the puzzles independently.

Detachment Measures the parent's lack of awareness, attention, and engagement with the child. Key features include being inattentive, perfunctory, or cold when interacting with child or, at the higher levels, complete lack of attention to or interaction with child.

NOTE: Scales are assessed on a seven-point scale, "1" indicating a very low incidence of the behavior and "7" indicating a very high incidence of the behavior. The 36-month puzzle task scales were adapted by Christy Brady-Smith, Rebecca M. Ryan, Lisa J. Berlin, Jeanne Brooks-Gunn, and Allison Sidle Fuligni. They are based on the "Manual for Coding the Puzzle Task" from the Newark Observational Study of the Teenage Parent Demonstration (TPD; Brooks-Gunn, Liaw, Michael, & Zamsky, 1992; Spiker, Ferguson, & Brooks-Gunn, 1993).

c. Psychometric Information for Key Constructed Variables

Table C.2A presents key psychometric data for the main study constructed variables created for the interim report and updated here. Table C.2B presents key psychometric data for the main study constructed variables included in this report. The tables are organized by measurement domain. We include the sample size, possible range of values for each variable, the actual range found in the Early Head Start sample, the sample mean, standard deviation, and the internal consistency reliability (coefficient alpha). The psychometric data are presented for the full sample, that is, with the program and control group combined.

TABLE C.2A

DESCRIPTIVE INFORMATION FOR COMPOSITE VARIABLES CONSTRUCTED FROM 24-MONTH PARENT INTERVIEWS AND CHILD ASSESSMENTS, FOR THE FULL SAMPLE

Measure	Sample Size	Possible Range Minimum	Possible Range Maximum	Range Minimum	Range Maximum	Mean	Standard Deviation	Internal Consistency Reliability[a]
Child Cognitive and Language Development								
Bayley Mental Development Index (MDI) Standard Score	1,781	49	150	49	134	89.1	13.7	NA
MacArthur Communicative Development Inventories (CDI) Vocabulary Production Score	2,070	0	100	0	100	54.8	23.0	0.98
MacArthur CDI Sentence Complexity Score	1,986	0	37	0	37	8.2	8.3	0.95
Child Social-Emotional Development								
Engagement During Parent-Child Semistructured Play	1,796	1	7	1	7	4.3	1.1	NA
Sustained Attention with Objects During Parent-Child Semistructured Play	1,796	1	7	1	7	5.0	1.0	NA
Negativity Toward Parent During Parent-Child Semistructured Play	1,796	1	7	1	7	1.7	1.0	NA
Bayley Behavioral Rating Scale (BRS): Emotional Regulation	1,916	1	5	1	5	3.6	0.8	0.92
Bayley BRS: Orientation/Engagement	1,911	1	5	1	5	3.6	0.8	0.83
Child Behavior Checklist: Aggressive Behavior	2,103	0	30	0	30	10.1	5.6	0.91
Quality of the Home Environment and Parenting								
Home Observation for Measurement of the Environment (HOME) Total Score	1,951	0	31	8.3	31	26.4	3.5	0.76
Parenting Behavior: Emotional Support								
HOME Emotional Responsivity	1,949	0	7	0	7	6.1	1.4	0.74
Supportiveness During Parent-Child Semistructured Play	1,709	1	7	1	7	4.0	1.1	0.83

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TABLE C.2A *(continued)*

Measure	Sample Size	Possible Range Minimum	Possible Range Maximum	Range Minimum	Range Maximum	Mean	Standard Deviation	Internal Consistency Reliability[a]
Parenting Behavior: Stimulation of Language and Learning								
HOME Support of Cognitive, Language, and Literacy Environment	2,148	0	12	0	12	10.2	1.7	0.68
Parent-Child Play	2,124	1	6	1	6	4.5	0.8	0.78
HOME Maternal Verbal-Social Skills	1,998	0	3	0	3	2.8	0.6	0.71
Parental Modernity Progressive	2,131	5	25	5	25	20.9	3.4	0.68
Parental Modernity Traditional	2,129	5	25	5	25	18.7	4.2	0.73
Parent-Child Outside Activities	2,124	1	6	1	6	2.8	0.7	0.71
Parenting Behavior: Negative Parenting Behavior								
Detachment During Parent-Child Semistructured Play	1,794	1	7	1	7	1.4	0.9	NA
Intrusiveness During Parent-Child Semistructured Play	1,796	1	7	1	7	1.9	1.0	NA
Negative Regard During Parent-Child Semistructured Play	1,796	1	7	1	7	1.4	0.8	NA
HOME Absence of Punitive Interactions	1,947	0	5	0	5	4.4	1.2	0.78
Knowledge of Child Development and Discipline Strategies								
Knowledge of Infant Development Inventory (KIDI)	2,141	1	4	1.8	4.0	3.4	0.4	0.56[b]
Percentage of Parents Who Would Use Mild Discipline Only	2,156	0	1	0	1	0.4	0.5	NA
Index of Severity of Discipline Strategies	2,156	1	5	1	5	2.7	1.7	NA
Self-Sufficiency								
Family Resource Scale	2,223	39	195	68.3	195	152.9	19.4	0.91
Parent Mental Health and Family Functioning								
Parenting Stress Index (PSI) Parent-Child Dysfunctional Interaction	2,130	12	60	12	56.7	17.2	5.9	0.78
PSI Parental Distress	2,131	12	60	12	60	25.4	9.3	0.82
Family Environment Scale (FES) Family Conflict	1,856	1	4	1	4	1.71	0.54	0.67
Composite International Diagnostic Interview (CIDI) – Short Form: Major Depression (probability)[c] (lower bound)	2,156	0	90.8	0	90.8	12.5	29.8	NA

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TABLE C.2A *(continued)*

Source: Parent interviews, child assessments, interviewer observations, and assessments of parent-child semistructured play assessments conducted when children were approximately 24 months old, and Parent Services Interviews conducted approximately 15 months after enrollment.

[a] Reliability was estimated using Cronbach's coefficient alpha formula.

[b] The KIDI items we used were a subset of the 20 used by the IHDP study. Although the resulting summary score did not meet our .65 internal consistency reliability criterion, we included the score in the impact analysis because parent knowledge was a key outcome for many of the programs and these items have been used successfully in other studies with other samples. It is likely that our reduction of the number of items resulted in the reduced reliability.

[c] A skip logic error in the version of the CIDI that we used prevented us from scoring the CIDI in the usual way. Based on the advice of the CIDI developer, we created 2 versions of the CIDI scores-a lower and upper bound (the true CIDI score is between these two scores). The lower and upper bound scores tend to be 1 to 4 percentage points apart for the full sample and most subgroups. The impact estimates and their significance using both versions are very similar. In the report, we use the lower bound version of the measure (the most conservative estimate of the probability of depression).

TABLE C.2B

DESCRIPTIVE INFORMATION FOR COMPOSITE VARIABLES CONSTRUCTED FROM 36-MONTH PARENT INTERVIEWS AND CHILD ASSESSMENTS, FOR THE FULL SAMPLE

Measure	Sample Size	Possible Range		Range		Mean	Standard Deviation	Internal Consistency Reliability[a]
		Minimum	Maximum	Minimum	Maximum			
Child Cognitive and Language Development								
Bayley Mental Development Index (MDI) Standard Score	1,658	49	150	49	134	90.6	12.6	NA
Peabody Picture Vocabulary Test (PPVT-III) Standard Score	1,424	40	160	41	125	83.0	15.6	NA
Teste de Vocabulario en Images Peabody (TVIP) Standard Score	228	78	145	78	131	95.3	8.2	NA
Child Social-Emotional Development								
Engagement During Parent-Child Semistructured Play	1,659	1	7	1	7	4.7	1.0	NA
Sustained Attention with Objects During Parent-Child Semistructured Play	1,656	1	7	2	7	4.9	1.0	NA
Engagement During Parent-Child Puzzle Challenge Task	1,645	1	7	1	7	5.0	0.9	NA
Persistence During Parent-Child Puzzle Challenge Task	1,634	1	7	1	7	4.5	1.2	NA
Bayley Behavioral Rating Scale (BRS): Emotional Regulation	1,759	1	5	1	5	3.9	0.8	0.90
Bayley BRS: Orientation/Engagement	1,768	1	5	1	5	3.8	0.7	0.80
Negativity Toward Parent During Parent-Child Semistructured Play	1,659	1	7	1	7	1.3	0.6	NA
Frustration with Parent-Child Puzzle Challenge Task	1,642	1	7	1	7	2.7	1.3	NA
Child Behavior Checklist: Aggressive Behavior	2,031	0	38	0	37	11.1	6.5	0.88
Quality of the Home Environment and Parenting: Overall and Physical Environment								
Home Observation for Measurement of the Environment (HOME) Total Score	1,807	0	37	10	37	27.2	4.8	0.80
HOME Internal Physical Environment	1,777	3	9	3	9	7.8	1.5	0.77

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TABLE C.2B *(continued)*

Measure	Sample Size	Possible Range		Range		Mean	Standard Deviation	Internal Consistency Reliability[a]
		Minimum	Maximum	Minimum	Maximum			
Parenting Behavior: Emotional Support								
HOME Warmth	1,794	0	3	0	3	0.3	0.6	0.72
Supportiveness During Parent-Child Semistructured Play	1,658	1	7	1	6.3	3.9	0.9	NA
Supportive Presence During Parent-Child Puzzle Challenge Task	1,647	1	7	1	7	4.5	1.3	NA
Parenting Behavior: Stimulation of Language and Learning								
HOME Support of Language and Learning	1,861	0	13	1	13	10.5	2.0	0.67
Parent-Child Play	2,076	1	6	1	6	4.4	0.9	0.80
Quality of Assistance During Parent-Child Puzzle Challenge Task	1,646	1	7	1	7	3.5	1.2	NA
Parenting Behavior: Negative Parenting Behavior								
Detachment During Parent-Child Semistructured Play	1,659	1	7	1	6	1.2	0.6	NA
Intrusiveness During Parent-Child Semistructured Play	1,659	1	7	1	6	1.6	0.8	NA
Detachment During Parent-Child Puzzle Challenge Task	1,646	1	7	1	7	1.6	0.9	NA
Intrusiveness During Parent-Child Puzzle Challenge Task	1,646	1	7	1	7	2.7	1.3	NA
Negative Regard During Parent-Child Semistructured Play	1,658	1	7	1	6	1.3	0.6	NA
HOME Harshness	1,801	0	3	0	3	0.3	0.6	0.55
Discipline Strategies								
Percentage of Parents Who Would Use Mild Discipline Only	2,105	0	1	0	1	0.4	0.5	NA
Index of Severity of Discipline Strategies	2,105	1	5	1	5	3.4	1.6	NA
Self-Sufficiency								
Family Resource Scale	2,073	39	195	79	195	154.0	18.9	0.92
Parent Mental Health								
Parenting Stress Index (PSI) Parental Distress	1,634	12	60	12	60	25.2	9.6	0.84
PSI Parent-Child Dysfunctional Interaction	1,607	12	60	12	56.7	17.8	6.4	0.81

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TABLE C.2B *(continued)*

Measure	Sample Size	Possible Range		Range		Mean	Standard Deviation	Internal Consistency Reliability[a]
		Minimum	Maximum	Minimum	Maximum			
Family Environment Scale (FES) Family Conflict	1,442	1	4	1	4	1.7	0.5	0.68
Center for Epidemiological Studies Depression (CES-D; Short Form)	2,095	0	36	0	36	7.7	7.0	0.88
Family Environment Scale (FES) Family Conflict	1,442	1	4	1	4	1.7	0.5	0.68

Source: Parent interviews, child assessments, interviewer observations, and assessments of parent-child semistructured play assessments conducted when children were approximately 36 months old, and Parent Services Interviews conducted approximately 15 months after enrollment.

[a] Reliability was estimated using Cronbach's coefficient alpha formula.

d. Father Study Measures and Constructed Variable Psychometrics

Data about fathers in this report are from three main sources: (1) parent interviews conducted in all 17 research sites when the children were approximately 14, 24, and 36 months old, (2) father interviews conducted in the 12 father study sites when the children were approximately 24 and 36 months old, and (3) father-child videotaped interactions conducted in 7 of the father study site when the children were approximately 24 and 36 months old. In this section we describe the main measures derived from each data source for this report and also present their psychometric properties.

Based on the parent interviews (usually conducted with the child's mother), we constructed variables that summarize whether the child's biological father was present in the child's life, whether a male (the biological father or a father figure--in the case that the biological father did not live with the child) was present in the child's life, and whether the mother was married to the child's biological father or if he was either married to her, lived with her, or was her boyfriend. We defined father presence as: (1) the child and the biological father live together, (2) the child and the biological father do not live together but he sees the child a few times per month or more, (3) the child and the biological father do not live together and do not see each other a few times or month or more, but the mother reports that there is a man in the child's life who is, "like a father" to the child. We created these variables at discreet points in time and also used them to create longitudinal variables that described father presence and marital status in relation to the mother.

At 24 and 36 months, we collected data directly from fathers and father figures identified by mothers as being involved in the lives of their children in the 12 father study sites. The father study response rates by site are reported in Appendix B. We designed the father study interviews to include a large degree of overlap with the parent interviews to allow us to compare mother and father responses. To measure father activities related to program services, we adapted questions from the parent services interviews and included them in the father interview. We also were interested in unique aspects of fathering and father-child interaction and included measures that would tap those constructs as well. The father-child videotaped interactions were identical to the parent-child interactions and were coded in the same way as described above.

In Box IV.1, we reported on five father program-related activities and the frequency with which fathers reported that they participated in those activities. In Box V.10 (Chapter V in Volume I), we described mother reports of father presence and marriage as described above. The rest of the Box V.10 father measures are described in Box C.2C. Their psychometric properties are described in Table C.2C.

BOX C.2C

FATHER STUDY MEASURES

Father Activities with Child – measures the frequency with which the father or father figure reported engaging in different activities with the child over the past month. These included social activities; activities that can stimulate language development, such as reading or telling stories, dancing, singing, and playing outside together; caregiving activities such as putting the child to bed getting up at night with the child, and preparing meals. Item responses are coded on a six-point scale, with zero indicating "not at all", and five indicating "more than once a day."

Eliminating 8 items that had low variability, we factor analyzed 25 father-child activity items using a Varimax rotation to develop four factor scores. We selected a factor solution that conformed to the following criteria: (1) factors made conceptual sense, (2) yielded an internal consistency reliability (Coefficient alpha) of .65 or greater, (3) minimized the number of items that loaded appreciably (.35 or greater) on multiple factors, and (4) minimized the number of items that did not load appreciably on any factors. To make it possible to compare responses across the four different scores, we standardized raw factor scores by converting them to *T*-scores. *T*-Scores have a mean of 50 and a standard deviation of 10.

Frequency of Caregiving Activities Score – measures the frequency the father or father figure reports engaging in eight different caregiving activities, such as helping with tooth brushing or bathing the child. *T*-Scores ranged from 1 to 70.

Frequency of Social Activities Score – measures the frequency with which fathers and father figures reported engaging in five activities that had a social or external component, such as taking the child to visit relatives or going to a restaurant. *T*-Scores ranged from 1 to 73.

Frequency of Cognitive Activities Score – measures the frequency with which fathers and father figures reported engaging in five activities that had a cognitive development component, such as singing nursery rhymes, reading stories, or telling stories. *T*-Scores ranged from 1 to 73.

Frequency of Physical Play Score – measures the frequency with which fathers or father figures reported engaging in six activities that connoted play, ranging from calm activities such as rolling a ball or bouncing on the knee, to rough and tumble, such as playing chasing games or turning the child upside down. *T*-Scores ranged from 1 to 73.

Father Well-Being –

Parenting Stress Index – Short Form (PSI-SF) – measures the degree of stress in parent-child relationships stemming from three possible sources: the child's challenging temperament, parental depression, and negatively reinforcing parent-child interactions (Abidin 1995). We included two subscales of the PSI-SF:

Parental Distress – measures the level of distress the parent is feeling in his or her role as a parent stemming from personal factors, including a low sense of competence as a parent, stress because of perceived restrictions stemming from parenting, depression, and lack of social support.

The parent answers whether he or she agrees or disagrees with statements such as, "You often have the feeling that you cannot handle things very well," and "You feel trapped by your responsibilities as a parent," and "You feel alone and without friends." Item responses are coded on a 5-point scale, with 5 indicating high levels of parental distress. Scores on the 12-item subscale can range from 12 to 60.

Parent-Child Dysfunctional Interaction – measures the father's perception that the child does not meet the father's expectations and interactions with the child are not reinforcing the father. The father may perceive that the child is abusing or rejecting the father or that the father feels disappointed in or alienated from the child.

The father answers whether he agrees or disagrees with statements such as, "Your child rarely does things for you that make you feel good," and "Most times you feel that your child does not like you and does not want to be close to you," and "Your child seems to smile less than most children." Item responses are coded on a 5-point scale, with 5 indicating high levels of parent-child dysfunctional interaction. Scores on the 12-item subscale can range from 12 to 60.

Center for Epidemiological Studies Depression Scale – Short Form (CESD-SF) – measures symptoms of depression (Ross et al. 1983). It does not indicate a diagnosis of clinical depression, but it does discriminate between depressed patients and others. The scale includes 12 items taken from the full, 20-item CESD scale (Radloff 1977). Respondents were asked the number of days in the past week they had a particular symptom. Symptoms include poor appetite, restless sleep, loneliness, sadness, and lack of energy. Items coded on a four-point scale from rarely (0) to most days (3). Scores on the scale range from 0 to 36.

Severe Depressive Symptoms – percentage of fathers whose scores on the CESD-SF were 15 or higher. This corresponds to a score of 25 or higher on the full CES-D, which is used to indicate high levels of depressive symptoms (Seligman 1993).

Family Environment Scale – measures the social environments of families along 10 key dimensions, including family relationships (cohesion, expressiveness, and conflict); emphases within the family on aspects of personal development that can be supported by families (for example, achievement orientation; independence); and maintenance of the family system (organization and control) (Moos and Moos 1976). We measured one dimension:

Family Conflict – measures the extent to which the open expression of anger and aggression and generally conflictual interactions are characteristic of the family. Parents respond to items on a 4-point scale, where 4 indicates higher levels of agreement with statements such as, "We fight a lot," and "We hardly ever lose our tempers." Items were recoded and averaged so that 4 indicates high levels of conflict.

Discipline Strategies – measures the father's strategies for handling four different potential conflict situations with the child: (1) the child keeps playing with breakable things; (2) the child refuses to eat; (3) the child throws a temper tantrum in a public place; and (4) the child hits the parent in anger. Fathers provided open-ended answers to how they would respond to each of the four situations, and these responses were classified into the types of discipline strategies, which were coded as binary variables. A father received a "1" for each strategy that was ever mentioned. In addition, we created the following composite measure:

Index of Severity of Discipline Strategies – measures the degree of harshness of discipline strategies suggested. An individual's score on this index ranges from 1 to 5, and is determined by the harshest strategy that was suggested in response to any of the three conflict situations. Thus, fathers who said they would use physical punishment receive a 5; those who did not suggest physical punishment but did say they would shout at the child receive a 4; those whose harshest response was to threaten the child with punishment receive a 3; those who suggest sending the child to his or her room, ignoring the behavior, threatening time out or loss of treats, or saying "No!" receive a 2; and those who suggested only preventing the situation or distracting the child, removing the child or object, talking to the child, or putting the child in time out receive a 1.

Spanked Child in Previous Week – measures father's report that he used physical punishment in the previous week by spanking the child.

Parenting Behavior –

During Father-Child Semistructured Play – measures the father's behavior with the child during a semistructured play task. The father and child were given three bags of interesting toys and asked to play with the toys in sequence. The semistructured play task was videotaped, and child and parent behaviors were coded by child development researchers according to strict protocols. This assessment was adapted for this evaluation from the Three Box coding scales used in the NICHD Study of Early Child Care (NICHD Early Child Care Research Network 1999). Coded dimensions of parenting behavior included:

Supportiveness – this composite measure is an average of father sensitivity, cognitive stimulation, and positive regard during play with the child. *Sensitivity* includes such behavior as acknowledgement of the child's affect, vocalizations, and activity; facilitating the child's play; changing the pace of play when the child seems under-stimulated or over-excited; and demonstrating developmentally appropriate expectations of behavior. *Cognitive stimulation* involves taking advantage of the activities and toys to facilitate learning, development, and achievement; for example, by encouraging the child to talk about the materials, by encouraging play in ways that illustrate or teach concepts such as colors or sizes, and by using language to label the child's experiences or actions, to ask questions about the toys, to present activities in an organized series of steps, and to elaborate on the pictures in books or unique attributes of objects. *Positive regard* includes praising the child, smiling or laughing with the child, expressing affection, showing empathy for the child's distress, and showing clear enjoyment of the child.

Intrusiveness – measures the extent to which the father exerts control over the child rather than acting in a way that recognizes and respects the validity of the child's perspective. Higher scores on intrusiveness indicate that the father controlled the play agenda, not allowing the child to influence the focus or pace of play, grabbing toys away from the child, and not taking turns in play with the child.

During Father-Child Puzzle Challenge Task – measures the father's behavior with the child during a puzzle completion task. The child was given a puzzle to play with, and the father was instructed to give the child any help needed. After 3 minutes, or earlier if the puzzle was completed, the interviewer gave the child a second, harder puzzle and asked the father not to help the child. If that puzzle was completed or 3 minutes elapsed, another, more challenging puzzle was provided. The puzzle challenge task was videotaped, and child and father behaviors were coded on a 7-point scale by child development researchers according to strict protocols. Four aspects of the father's behavior with the child were rated on a 7-point scale:

Quality of Assistance – measures the frequency and quality of clear guidance to the child, flexible strategies for providing assistance, and diverse, descriptive verbal instructions and exchanges with the child.

Intrusiveness – measures the degree to which the father controls the child rather than recognizing and respecting the validity of the child's independent efforts to solve the puzzle. For example, a father behaving intrusively may complete the puzzle for the child or offer rapid, frequent instructions.

Child Behavior with Father -

Child Behavior Checklist – Aggressive Behavior – this subscale measures the incidence of 19 child behavior problems that tend to occur together and constitute aggressive behavior problems. Parents completed the Aggressive subscale of the Child Behavior Checklist for Ages 1 ½ to 5 Years (Achenbach and Rescorla 2000). Some behaviors asked about include, "Child has temper tantrums," "Child hits others," and "Child is easily frustrated." For each of the possible behavior problems, the father was asked whether the child exhibits this behavior often, sometimes, or never. Scores range from 0, if all of the behavior problems are "never" observed by the parent, to 38, if all of the behavior problems are "often" observed.

During Father-Child Semistructured Play – measures the child's behavior with the father during the semistructured play task.

Engagement – measures the extent to which the child shows, initiates, or maintains interaction with the father. This may be expressed by approaching or orienting toward the father, establishing eye contact with the father, positively responding to the fathers' initiations, positive affect directed toward the father and/or engaging the parent in play. Very high engagement receives a 7.

Sustained Attention with Objects – measures the degree to which the child is involved with the toys presented in the three bags. Indicators include degree to which the child "focuses in" when playing with an object and the extent to which the child coordinates activities with several objects and/or explores different aspects of a toy. Very high sustained attention receives a 7.

Negativity Toward Father – measures the degree to which the child shows anger, hostility, or dislike toward the father. Expressions may be overt (for example, forcefully rejecting a toy offered by the parent or pushing the parent away) or covert (for example, hitting or throwing an object in response to the parent's behavior). Very high negativity receives a 7.

During Father-Child Puzzle Challenge Task – measures the child's behavior with the father during the puzzle completion task.

Engagement – measures the extent to which the child shows, initiates, or maintains interaction with the father. This may be expressed by approaching or orienting toward the father, establishing eye contact with the father, positively responding to the father's suggestions, positive affect directed toward the father and/or engaging the father in the puzzle task. Very high engagement receives a 7.

Persistence – measures how goal-oriented, focused, and motivated the child remains toward the puzzle throughout the task. The focus of this measure is on the child's apparent effort to solve the puzzle, not on how well the child performs. Very high persistence receives a 7.

Frustration with Task – measures the degree to which the child expresses frustration or anger toward the puzzle task, for example, by putting hands in lap, whining, pushing away puzzle pieces, crying about the puzzle, saying it is too hard, or throwing puzzle pieces. Very high frustration receives a 7.

TABLE C.2C

DESCRIPTIVE INFORMATION FOR COMPOSITE VARIABLES CONSTRUCTED FROM 36-MONTH FATHER INTERVIEWS AND FATHER-CHILD INTERACTIONS, FOR THE FULL FATHER STUDY SAMPLE

Measure	Sample Size	Possible Range		Range		Mean	Standard Deviation	Internal Consistency Reliability[a]
		Minimum	Maximum	Minimum	Maximum			
Father Activities with Child								
Frequency of Caregiving Activities Score	670	1	70	1	70	49.8	11.1	0.84
Frequency of Social Activities Score	670	1	73	1	73	49.8	11.8	0.79
Frequency of Cognitive Activities Score	671	1	73	1	73	49.6	11.1	0.79
Frequency of Physical Play Score	671	1	73	1	73	49.7	10.8	0.72
Father Well-Being								
Parenting Stress Index (PSI) Parental Distress	642	12	60	12	43	19.5	5.8	0.79
PSI Parent-Child Dysfunctional Interaction	643	12	60	11	36	14.3	4.2	0.81
CES-D: Not at Risk of Depression	622	0	1	0	1	0.6	0.5	NA
CES-D: Severe Depressive Symptoms	622	0	1	0	1	0.1	0.3	NA
Family Environment Scale (FES) Family Conflict	671	1	4	1	3.5	1.4	0.5	0.67
Discipline Strategies								
Index of Severity of Discipline Strategies	646	1	5	1	5	3.3	1.6	NA
Percentage of Fathers Who Spanked the Child in the Past Week	624	0	1	0	1	0.3	0.5	NA
Percentage of Parents Who Would Use Mild Discipline Only	647	0	1	0	1	0.4	0.5	NA
Parenting Behavior								
Supportiveness During Father-Child Semistructured Play	302	1	7	2	6.3	4.1	1.0	0.86
Intrusiveness During Father-Child Semistructured Play	302	1	7	1	4	1.4	0.7	NA
Quality of Assistance During Father-Child Puzzle Challenge Task	298	1	7	1	6	3.3	1.1	NA
Intrusiveness During Father-Child Puzzle Challenge Task	298	1	7	1	7	2.6	1.3	NA

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TABLE C.2C *(continued)*

Measure	Sample Size	Possible Range Minimum	Possible Range Maximum	Range Minimum	Range Maximum	Mean	Standard Deviation	Internal Consistency Reliability[a]
Child Behavior with Father								
Child Behavior Checklist: Aggressive Behavior	635	0	38	0	34	10.7	6.0	0.85
Engagement of Father During Father-Child Semistructured Play	303	1	7	2	7	5.0	0.9	NA
Sustained Attention with Objects During Father-Child Semistructured Play	302	1	7	2	7	5.1	0.9	NA
Negativity Toward Father During Father-Child Semistructured Play	303	1	7	1	3	1.1	0.3	NA
Engagement of Father During Father-Child Puzzle Challenge Task	300	1	7	2	7	5.2	0.8	NA
Persistence During Father-Child Puzzle Challenge Task	300	1	7	2	7	4.9	1.1	NA
Frustration During Father-Child Puzzle Challenge Task	300	1	7	1	6	2.3	1.2	NA

Source: Father interviews and assessments of father-child videotaped interactions conducted when children were approximately 36 months old.

[a] Reliability was estimated using Cronbach's coefficient alpha formula.

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C.3 CONSTRUCTION OF TIMELINES

The employment- and education-related outcome variables were constructed from weekly timelines signifying whether the primary caregiver was employed or in a school or training program in each *week* during the 26 months after random assignment. Similarly, the welfare-related and some child care-related outcome variables were constructed using *monthly* timelines signifying whether the family was receiving various forms of public assistance benefits and using child care in each month. These timelines were constructed using data from the 6-, 15-, and 26-month Parent Service Interviews.

Timelines were constructed using start and end dates of spells. Positive integers were used to signify that the caregiver was in a spell in a week (month) after random assignment. If the reported *day* that a spell started or ended was missing, we set the day to "15." However, if the month or year was missing, the relevant timeline entries were set to "missing" using alphabetic codes. A timeline entry could have multiple codes pertaining to overlapping spells. For example, a code of '1B' signified that the caregiver was working on the first job reported in the survey, but also that we were unsure whether she was working on job 2.

The variables pertaining to weeks (months) spent employed, in school or training, or on welfare during the 26 months after random assignment were constructed by summing the number of weeks (months) that the relevant timelines had positive codes. The variables were set to zero if the family had no spells, and they were set to "missing" if any timeline entry had a missing code but no positive code. Similarly, variables pertaining to hours spent in employment, education activities, and child care were constructed using the timelines and survey information on the number of hours per week the caregiver or child usually spent in each activity. Finally, we constructed variables pertaining to the amount of public assistance benefits that were received using the welfare timelines and information on the monthly amount of benefits received for each spell of receipt.

C.4 TABLES OF NONMISSING VALUES FOR CONSTRUCTS

In the body of this report, all sample sizes given in tables of findings are for the full sample of respondents to the relevant data source (such as the 26-month parent services interview or the 36-month Bayley). One important characteristic of the Early Head Start data is that most parents and children who responded at all completed most of the questions and items and have data for the constructs derived in the impact analyses described in the body of this report.

The variables are organized by type, with the service-use variables listed first, followed by the child, parenting, and family outcomes. Although in a few cases response rates are below 90 percent, as Table C.4A shows, 99 percent or more of the respondents completed the vast majority of items.

TABLE C.4A

DATA ITEM RESPONSE FOR KEY OUTCOME MEASURES USED IN THE EARLY HEAD START INTERIM IMPACT ANALYSIS, BY RESEARCH STATUS

Outcome Measure	Program Group	Control Group
Service Receipt		
Received Any Key Services	99.3	97.2
Received Any Home Visits or Center-Based Child Care	98.6	94.4
Received More Than 1 Home Visit or 2 Weeks Center-Based Child Care	98.0	92.7
Received Home Visits or Center Care at Required Intensity in At Least 1 Followup	82.0	81.1
Received Home Visits or Center Care at Required Intensity in All 3 Followups	82.0	81.1
Received Any Home Visits	99.9	98.9
Received Any Child Development Services During Home Visits	99.9	99.8
Received Weekly Home Visits		
1st Followup	94.2	95.2
2nd Followup	95.1	97.0
3rd Followup	96.6	98.4
Received Weekly Home Visits in At Least 1 Followup	88.4	92.2
Received Weekly Home Visits in All 3 Followups	88.4	92.2
Received Any Child Care	91.8	90.0
Received Any Center-Based Child Care	93.4	93.3
Average Hours/Week of Center-Based Child Care	93.4	93.3
Received Child Care in Concurrent Arrangements	91.8	90.0
Average Weekly Out-of-Pocket Cost of Care	91.8	89.9
Received a Child Care Subsidy	71.7	71.5
Participated in Any Case Management Meeting	99.7	99.7
Weekly Case Management		
1st Followup	93.2	92.7
2nd Followup	97.4	98.1
3rd Followup	98.6	98.9
Participated in Any Group Parenting Activity	99.2	98.6
Participated in Any Group Parent-Child Activities	98.3	98.4
Child Was Identified with a Disability	97.6	96.8
Received Early Intervention Services for Child with a Disability	99.8	99.8
Percentage of Children Who Received Any Health Services	99.7	99.7
Percentage of Children Who Visited a Doctor	94.4	95.5
Percentage of Children Who Visited an Emergency Room	99.0	99.2
Average Number of Emergency Room Visits for Treatment of Accident/Injury	100.0	100.0
Percentage of Children Who Visited a Dentist	99.3	99.5
Percentage of Children Who Received Any Screening Test	99.2	99.5
Percentage of Children Who Received Any Immunizations	99.9	99.9
Received Any Education-Related Services	100.0	99.9
Received Any Employment-Related Services	94.6	81.5
Received Any Family Health Services	98.6	99.0
Received Any Family Mental Health Services	99.9	99.8
Received Any Transportation Assistance	100.0	99.9
Received Any Housing Assistance	96.9	96.7
Child Cognitive and Language Development		
Bayley Mental Development Index	79.4	77.7
Percent with Bayley MDI Below 85	79.4	77.7
PPVT-III Standard Score	67.9	67.0
Percentage with PPVT-III Below 85	67.9	67.0

Table C.4A (*Continued*)

Outcome Measure	Program Group	Control Group
Child Social-Emotional Development		
Bayley Behavior Rating Scale (BRS): Emotional Regulation	83.8	83.0
Bayley BRS: Orientation/Engagement	84.6	83.1
Child Behavior Checklist: Aggressive Behavior	96.6	95.9
Sustained Attention with Objects During Parent-Child Semistructured Play	78.0	79.0
Negativity Toward Parent During Parent-Child Semistructured Play	78.2	79.0
Engagement During Parent-Child Semistructured Play	78.2	79.0
Engagement During Parent-Child Puzzle Challenge Task	78.3	77.6
Persistence During Parent-Child Puzzle Challenge Task	77.9	77.0
Frustration During Parent-Child Puzzle Challenge Task	78.1	77.5
Child Health Status		
Child's Health Status	99.7	99.9
Percentage of Children in Fair or Poor Health	99.7	99.9
Quality of the Home Environment and Parenting: Overall and Physical Environment		
Home Observation for Measurement of the Environment (HOME) Total Score	84.8	86.5
HOME Internal Physical Environment	83.4	85.1
Parenting Behavior: Emotional Support		
HOME: Warmth	84.2	85.9
Supportiveness During Parent-Child Semistructured Play	79.0	78.2
Supportive Presence During Parent-Child Puzzle Challenge Task	78.3	77.8
Parenting Behavior: Stimulation of Language and Learning		
Quality of Assistance During Parent-Child Puzzle Challenge Task	78.2	77.8
HOME Support of Language and Literacy	87.7	88.7
Parent-Child Play	98.2	98.6
Percentage of Children with a Regular Bedtime	99.8	99.6
Percentage of Children Who Follow a Bedtime Routine	99.5	99.4
Percentage of Parents Who Read to Child Daily	97.8	98.6
Percentage of Parents Who Read to Child at Bedtime	99.5	99.4
Parenting Behavior: Negative Parenting Behavior		
Detachment During Parent-Child Semistructured Play	79.0	78.2
Detachment During Parent-Child Puzzle Challenge Task	78.3	77.7
Intrusiveness During Parent-Child Semistructured Play	79.0	78.2
Intrusiveness During Parent-Child Puzzle Challenge Task	78.2	77.8
Negative Regard During Parent-Child Semistructured Play	79.0	78.2
HOME: Harshness	84.7	86.0
Percentage of Parents Who Spanked Child in the Past Week	96.2	96.1
Knowledge of Safely Practices and Discipline Strategies		
Percentage of Parents Suggesting Physical Punishment as a Discipline Strategy	99.8	99.7
Percentage of Parents Who Would Use Mild Discipline Only	99.8	99.7
Index of Severity of Discipline Strategies	99.8	99.7
Percentage of Parents Who Always Use a Car Seat	99.7	99.7

Table C.4A (*Continued*)

Outcome Measure	Program Group	Control Group
Parent Physical and Mental Health		
Parenting Stress Index (PSI): Parental Distress	97.2	97.4
PSI: Parent-Child Dysfunctional Interaction	96.7	94.8
Family Environment Scale (FES): Family Conflict	86.4	87.0
Center for Epidemiological Studies Depression (CES-D; Short Form)	98.9	99.7
CES-D Severe Depressive Symptoms	98.9	99.7
Parent's Health Status	98.7	99.7
Father Presence		
Currently Married to Biological Father	95.3	95.4
Biological Father is Currently Married to, Lives with, or is Boyfriend of Respondent	95.3	95.4
Biological Father Currently Present in Child's Life	92.3	92.9
Continuous Biological Father Presence Child Age 14-36[a]	86.0	88.2
No Biological Father Presence Child Age 14-36[a]	86.0	88.2
Continuous Male Presence Child Age 14-36[a]	91.1	92.6
No Continuous Male Presence Child Age 14-36[a]	91.1	92.6
Any Self-Sufficiency Activities		
Percentage of Parents Ever Employed or in an Education or Job Training in First 26 Months	99.9	99.4
1st Quarter	99.5	99.1
2nd Quarter	99.4	98.9
3rd Quarter	98.2	98.2
4th Quarter	97.6	97.6
5th Quarter	98.3	97.4
6th Quarter	96.8	97.4
7th Quarter	96.7	97.8
8th Quarter	96.6	98.1
Average Hours per Week Employed at All jobs and in Any Education or Training in First 26 Months	85.3	87.0
Employment Activities		
Percentage of Parents Ever Employed in First 26 Months	99.9	99.7
1st Quarter	99.6	99.6
2nd Quarter	99.6	99.3
3rd Quarter	98.8	99.1
4th Quarter	98.3	98.3
5th Quarter	98.6	98.4
6th Quarter	97.6	98.6
7th Quarter	97.0	98.8
8th Quarter	97.2	99.0
Average Hours per Week Employed at All Jobs in First 26 Months	90.1	92.0
Education Activities		
Percentage of Parents Who Ever Participated in an Education or Training Program in First 26 months	98.5	99.0
1st Quarter	99.5	99.4
2nd Quarter	99.1	98.9
3rd Quarter	98.4	98.2
4th Quarter	98.0	98.3
5th Quarter	98.2	98.1
6th Quarter	97.0	96.9
7th Quarter	97.1	97.4

Table C.4A (*Continued*)

Outcome Measure	Program Group	Control Group
8th Quarter	97.2	98.0
Average Hours Per Week in an Education Program During First 26 Months	94.1	94.5
Types of Education Activities		
High School	99.3	99.7
English as a Second Language	99.6	99.4
Any Vocational Education	98.9	99.3
Highest Grade Completed at Third Followup		
GED Certificate	99.7	99.7
High School Diploma	99.5	99.7
Welfare Program Participation		
Percentage of Parents Who Received Any Welfare Benefits during First 26 Months	97.8	97.2
Total Welfare Benefits Received during First 26 Months	70.9	70.6
Percentage of Parents Who Received AFDC or TANF Benefits during first 26 Months	96.9	96.9
1st Quarter	96.4	96.0
2nd Quarter	96.8	96.8
3rd Quarter	89.9	89.5
4th Quarter	87.0	87.5
5th Quarter	86.2	85.9
6th Quarter	77.1	77.3
7th Quarter	73.8	74.3
8th Quarter	73.9	74.1
Total AFDC or TANF Benefits Received during First 26 Months	83.5	85.0
Percentage of Parents Who Received Food Stamp Benefit during First 26 Months	98.2	97.8
Average Total Food Stamp Benefit Received during First 26 Months	82.7	82.9
Family Income and Resources		
Percentage of families with Income above the Poverty Line at Third Followup	93.8	93.8
Subsequent Births		
Subsequent Birth by 24 Months after Random Assignment	85.3	84.8

SOURCE: 36-month parent interviews and Bayley and video assessments, and 6-, 15-, and 26-month parent services interviews.

[a]Data Sources for longitudinal father outcomes are 14-, 24-, and 36-month parent interviews.

C.5 IMPLEMENTATION MEASURES

The first step to measuring the extent of program implementation is establishing a clear definition of a fully implemented program. For the purposes of this research, we defined the degree of implementation as the extent to which programs offered services that met the requirements of the Early Head Start grant announcement (U.S. Department of Health and Human Services 1995) and selected key elements of the revised Head Start Program Performance Standards (U.S. Department of Health and Human Services 1996). We defined "full implementation" as substantially implementing, or exceeding expectations for implementing, these key program elements.

To assess the extent of program implementation, we developed implementation rating scales, checklists for organizing the information needed to assign ratings to programs, and a rating process. We designed this rating system to help us reduce a large amount of information on program implementation into summary variables for testing hypotheses about how implementation relates to outcomes and to systematically analyze the research programs' progress toward full implementation over time. This sections describes our data sources, the rating scales we developed, and the rating process we followed for assessing implementation.[1]

a. Data Sources

For these analyses, we relied primarily on information collected during site visits conducted in fall 1997 and fall 1999 and self-administered surveys completed by program staff at the time of the site visits. To facilitate the systematic assignment of implementation ratings for each program, site visitors assembled the site visit and staff survey information in checklists organized according to key program elements of the performance standards. In addition, site visitors wrote detailed program profiles based on information obtained during the site visits. Program directors and their local research partners reviewed the profiles and checklists for their programs, provided corrections of erroneous information, and in some cases provided additional clarifying information.

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[1] More detailed information about the implementation analysis can be found in *Pathways to Quality* (Administration on Children, Youth and Families 2002).

b. Implementation Rating Scales

To develop implementation rating scales, we identified specific criteria for determining the degree to which programs implemented Early Head Start's three major program areas as defined in the performance standards: (1) early childhood development and health services, (2) family and community partnerships, and (3) program design and management. To refine our assessment, we created distinct criteria for both family and community partnerships. Likewise, within program design and management we created separate criteria for staff development and program management systems.

The criteria encompass key program requirements contained in the Early Head Start grant announcement and the performance standards. Because the purpose of the ratings was to identify and track over time the implementation of key program requirements and *not* to monitor compliance, we focused on key requirements needed to help us identify pathways to full implementation and to summarize and quantify a large amount of qualitative information on program implementation. We reviewed our initial criteria with representatives of the Head Start Bureau and the Early Head Start technical assistance network to ensure that they included the most important subset of program requirements. We also solicited comments from members of the Early Head Start Research Consortium. Table C.5A summarizes the 25 program elements we assessed organized according to program area.

TABLE C.5A

PROGRAM ELEMENTS INCLUDED IN THE EARLY HEAD START IMPLEMENTATION RATING SCALES

Scale	Program Element
Early Childhood Development and Health Services	
	Frequency of child development services
	Developmental assessments
	Follow-up services for children with disabilities
	Child health services
	Child care services
	Parent involvement in child development services
	Individualization of child development services
	Group socialization activities
Family and Community Partnerships	
Family Partnerships	Individualized family partnership agreements
	Availability of services
	Frequency of family development services
	Parent involvement
Community Partnerships	Collaborative relationships with other service providers
	Advisory committees
	Transition plans
Management Systems and Procedures	
Staff Development	Supervision
	Training
	Staff retention
	Compensation
	Staff morale
Program Management	Policy council
	Communication systems
	Goals, objectives, and plans
	Self-assessment
	Community needs assessment

Prior to our fall 1997 site visits, we created a rating scale for each of the program elements. In 1999, we made some minor revisions to these scales to reflect clarifications in program guidance from the Head Start Bureau and our evolving understanding of the performance standards, which took effect after our fall 1997 site visits. Each rating scale contains five levels of implementation, ranging from minimal implementation (level 1) to enhanced implementation (level 5) (Table C.5B). We considered programs rated at level 1 through 3 to have reached partial implementation and programs rated at levels 4 and 5 to have reached full implementation of the particular program element rated.

c. Rating Process

Following each round of site visits, we used a consensus-based process to assign implementation ratings to each Early Head Start research program. We assembled a rating panel that included four national evaluation team members, a representative of the Early Head Start technical assistance network, and another outside expert. For each program, three people—the site visitor and two panel members—assigned ratings independently, based information contained in the checklists and program profile compiled by the site visitor. Ratings were assigned for each of the 25 program elements, the five program areas, and for overall implementation. In completing the ratings of overall implementation, we established the following guidelines for creating the overall ratings based on the ratings of the individual program components:

- ***Low-Level Implementation:*** Programs that reached only a low level of implementation had achieved moderate implementation in only one or two program areas. Other programs areas were poorly or minimally implemented.
- ***Moderate Implementation:*** To achieve this rating, programs were (1) fully implemented in a few program areas and moderately implemented in the other areas, (2) moderately implemented in all areas, (3) moderately implemented in most areas

TABLE C.5B

EARLY HEAD START NATIONAL EVALUATION IMPLEMENTATION RATING SCALE LEVELS

Level		Definition
Partial Implementation		
1	Minimal Implementation	Program shows little or no evidence of effort to implement the relevant program element
2	Low-Level Implementation	Program has made some effort to implement the relevant program element
3	Moderate Implementation	Program has implemented some aspects of the relevant program element
Full Implementation		
4	Full Implementation	Program has substantially implemented the relevant program element
5	Enhanced Implementation	Program has exceeded expectations for implementing the relevant program element

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with low-level implementation in one area, or (4) fully implemented in every area except child development and health services.

- ***Full Implementation:*** To be rated as fully implemented overall, programs had to be rated as fully implemented in most of the five component areas. Reflecting the Head Start Bureau's focus on child development, panel members gave special consideration to the rating of child development and health services, and weighted it more heavily in arriving at their consensus rating of overall implementation.
- ***Enhanced Implementation:*** A program demonstrating enhanced implementation was fully implemented in all areas and exceeded the standards in some of the component areas.

After these independent ratings were completed for all programs, the panel met to review the three sets of independent ratings, discuss differences in ratings across panel members, and assign consensus ratings for each program. We checked the validity of the our 1997 ratings by comparing them to independent ratings. After the Head Start Bureau completed monitoring visits to all 17 research programs in spring 1998, we asked a member of the monitoring team to use information collected during the monitoring visits to rate programs' using the rating scales we developed. We did not share with the monitoring team our rating results or the information we collected during site visits. The independent ratings assigned by the monitoring team member were very similar to those assigned by our rating panel, providing some validation that our ratings provide a good assessment of program implementation.

APPENDIX C REFERENCES

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APPENDIX D

ANALYTIC ISSUES AND DETAILS

This appendix describes details of analyses conducted to test a number of assumptions underlying the analytic approach taken in our assessment of Early Head Start's impacts on children and families. The specific issues that we investigated and report here are:

- D.1 Comparing the Baseline Characteristics of Program and Control Group Members, p. D.5
- D.2 Assessing and Correcting for the Effects of Nonresponse to the Early Head Start Interviews and Assessments, p. D.13
- D.3 Estimating Impacts per Participant, p. D.37
- D.4 Assessing the Robustness of Study Findings, p. D.41
- D.5 Results from the Growth Curve Analysis, p. D.49
- D.6 Estimating Impacts per Eligible Applicant, p. D.65
- D.7 Results from the Service Intensity Analysis, p. D.83
- D.8 Results from Rerun of 24-month Child and Family Outcomes, p. D.115
- D.9 Analyses of Parenting Outcomes at 24 Months as Mediators of Child Outcomes at 36 Months, p. D.141

D.1 COMPARING THE BASELINE CHARACTERISTICS OF PROGRAM AND CONTROL GROUP MEMBERS

In theory, randomized experimental designs ensure that differences in the average outcomes between program and control groups can be attributed to the intervention under investigation. This rigor is possible, however, only if the random assignment process generates program and control groups with similar characteristics, on average, at the time of random assignment. Thus, the benefits of the random assignment design can be realized only if random assignment is implemented correctly and produces equivalent research groups.

We believe that the process used in the Early Head Start study to randomly assign families to the program or control groups was implemented correctly. MPR staff controlled the process, random numbers generated from a computer were used to assign the families to a research status, and, to the best of our knowledge, local programs and research staff followed the specified procedures for obtaining applicants and notifying families of their group assignment.

In this appendix, we compare the characteristics of program and control group families to check that the random assignment process was implemented correctly. First, we discuss data sources and methods and then discuss analysis results.

1. Data Sources and Methods

We used data from the Head Start Family Information System (HSFIS) application and enrollment forms for the analysis. This information was collected *prior* to random assignment, so neither the quality of the data nor item response should differ by research status if random assignment was conducted properly. The HSFIS data contain demographic information on families, primary caregivers, and focus children.

We used standard statistical tests to assess the similarity of the two research groups, including univariate t-tests to compare variable means for binary and continuous variables and chi-square tests to compare distributions of categorical variables. In addition, we conducted a more formal multivariate analysis to test the hypothesis that variable means and distributions are *jointly* similar. For this analysis, we estimated logit regression models, where the probability that a family is in the program group was regressed on the HSFIS variables; we used chi-square tests to assess whether the coefficients on these explanatory variables were jointly significant. This multivariate procedure adjusts for the fact that univariate tests are expected to produce some significant test statistics by chance, even when the program and control groups are identical. For example, if the hypothesis tests are conducted at the 10 percent level of significance, then we would expect that 10 percent of independent tests would be falsely rejected. The multivariate procedure also accounts for correlations across measures, whereas the univariate procedure assumes that the measures are independent.

For several reasons, our main approach was to conduct the analysis using the sample pooled across all 17 research sites, rather than conduct separate analyses by site. First, pooling increases the power of the statistical tests. Second, it allows us to examine more HSFIS variables, because some variables vary little within sites. Finally, and most important, we used the *same* random assignment procedures for each site, so that we had no reason to believe that there would be differences in results across sites. However, we also conducted the analysis separately by site for selected HSFIS variables and display *p*-values for these tests.

2. Analysis Results

Table D.1A displays analysis results for the sample pooled across the 17 research sites. The table displays variable distributions for the program and control groups, as well as *p*-values for testing differences across the two groups. Table D.1B displays *p*-values by site for 12 selected variables.

TABLE D.1A

COMPARISON OF THE BASELINE CHARACTERISTICS OF ALL PROGRAM AND CONTROL GROUP MEMBERS

Variable	Program Group	Control Group	P-Value for Testing Differences
Site Characteristics			
Program Approach			.813
Center-based	20.2	20.6	
Home-based	46.7	45.6	
Mixed	33.0	33.9	
Overall Implementation Pattern			.957
Early implementers	34.5	34.8	
Later implementers	35.0	35.1	
Incomplete implementers	30.5	30.0	
Family and Parent Characteristics			
Age of Mother at Birth of Focus Child			.803
Younger than 20	39.0	39.5	
20 to 25	33.2	32.0	
25 or older	27.9	28.5	
Mother Was Younger than 19 at First Birth	42.9	41.2	.336
Highest Grade Completed			.175
Less than 12	47.7	47.8	
12 or earned a GED	27.3	29.8	
More than 12	24.9	22.4	
Race and Ethnicity			.968
White non-Hispanic	37.3	37.1	
Black non-Hispanic	34.2	35.0	
Hispanic	23.8	23.4	
Other (Asian or Pacific Islander, American Indian, Eskimo, Aleut)	4.7	4.5	
Primary Occupation			.826
Employed	22.9	23.8	
In school or a training program	22.0	21.4	
Other	55.0	54.7	

TABLE D.1.A *(continued)*

Variable	Program Group	Control Group	P-Value for Testing Differences
English Language Ability			.485
Primary language is English	79.9	78.1	
Primary language is not English but the applicant speaks English well	9.6	10.3	
Primary language is not English and the applicant does not speak English well	10.5	11.6	
Living Arrangements			.762
Living with a spouse	24.9	25.4	
Living with other adults	38.3	39.1	
Living with no other adults	36.8	35.5	
Adult Male Present in the Household	38.1	39.1	.586
Number of Adults in the Household[a]			.804
1	37.8	36.6	
2	49.8	50.8	
3 or more	12.4	12.6	
Number of Children Less than 5 Years Old in the Household Other than the Focus Child			.781
0	64.3	65.1	
1	27.0	26.8	
2 or more	8.7	8.1	
Number of Children Between 6 and 17 in the Household			.454
0	64.3	66.4	
1	23.1	21.3	
2 or more	12.6	12.3	
Number of Moves in the Past Year			.884
0	49.5	49.8	
1	28.9	28.1	
2 or more	21.6	22.1	
Owns Home	11.0	11.1	.907

TABLE D.1.A *(continued)*

Variable	Program Group	Control Group	P-Value for Testing Differences
Household Income as a Percent of the Poverty Level (Percent)			.257
Less than 33	30.2	30.0	
33 to 67	32.5	29.2	
67 to 99	24.0	26.5	
100 or more	13.3	14.3	
Welfare Receipt			
AFDC/TANF[a]	35.6	34.7	.627
Food Stamps	48.0	47.8	.889
Medicaid	76.6	74.7	.217
SSI	7.0	7.0	.978
WIC	87.5	85.9	.235
Public housing	9.5	8.9	.565
Has Inadequate Resources			
Food	4.9	6.3	.111
Housing	12.3	13.3	.432
Money to buy necessities	20.8	21.7	.588
Medical care	14.0	14.7	.577
Transportation	20.9	22.4	.334
Child care	34.4	34.6	.913
Money for supplies	27.1	29.4	.280
Support from friends	12.9	14.0	.414
Parent information	12.5	16.3	.005*
Maternal Risk Index[c]			.469
0 or 1 (low risk)	18.8	17.3	
2 or 3 (moderate risk)	54.2	56.4	
4 or 5 (high risk)	27.1	26.3	
Random Assignment Date			.808
Before 10/96	36.0	36.5	
10/96 to 6/97	30.2	30.8	
After 6/97	33.8	32.7	
Previously Enrolled in Head Start or Another Childhood Development Program[b]	12.8	13.4	.628

TABLE D.1.A *(continued)*

Variable	Program Group	Control Group	P-Value for Testing Differences
Characteristics of Focus Child			
Age (Months)			.330
Unborn	24.2	26.5	
Less than 5	36.1	34.7	
5 or more	39.7	38.7	
Male	51.7	50.4	.493
First Born	62.3	62.8	.783
Birthweight Less than 2,500 Grams[b]	9.9	8.4	.237
Born more than 3 Weeks Early[b]	15.8	12.0	.014*
Stayed in Hospital After Birth[b]	18.3	16.0	.178
People Concerned About the Child's Overall Health and Development[b]	13.0	13.3	.870
Received an Evaluation Because of Concerns About the Child's Overall Health and Development or Because of Suspected Developmental Delay[b]	6.0	6.9	.412
Risk Categories			
Has established risks[b]	11.6	10.6	.444
Has biological or medical risks[b]	18.3	16.8	.396
Has environmental risks[b]	32.5	36.4	.062*
Covered by Health Insurance[b]	90.1	89.6	.723
Sample Size	**1,513**	**1,488**	

SOURCE: HSFIS application and enrollment forms.

[a] The primary caregiver is considered to be an adult regardless of her age.

[b] These variables pertain to families with focus children who were born at baseline.

[c] This index was constructed by summing the number of the following risk factors that the mother faced: (1) being a teenage mother; (2) having no high school credential; (3) receiving public assistance; (4) not being employed or in school or training, and (5) being a single mother.

*Significantly different from zero at the .10 level, two-tailed test.

TABLE D.1B

P-VALUES FROM TESTS COMPARING THE BASELINE CHARACTERISTICS OF PROGRAM AND CONTROL GROUP MEMBERS, BY SITE

Site	Mother's Age	Mother's Education	Race and Ethnicity	Mother's Primary Occupation	Living Arrangements	Received AFDC or TANF	Received Food Stamps	Maternal Risk Index	Random Assignment Date	Child's Age	Child's Gender
1	.446	.903	.211	.976	.459	.820	.707	.809	.970	.576	.027*
2	.165	.482	.252	.948	.472	.700	.734	.820	.615	.400	.227
3	.927	.782	.795	.219	.073*	.107	.041*	.138	.981	.626	.896
4	.748	.496	.434	.722	.662	.682	.401	.131	1.00	.939	.951
5	.550	.158	.190	.559	.694	.361	.808	.840	.845	.464	.308
6	.863	.943	.505	.393	.598	.611	.757	.715	.666	.344	.952
7	.978	.084*	.840	.071*	.052*	.147	.726	.893	.924	.541	.677
8	.824	.355	.683	.499	.773	.115	.858	.879	1.00	.749	.778
9	.970	.217	.579	.533	.401	.326	.791	.286	.985	.306	.362
10	.594	.786	.507	.619	.680	.225	.331	.185	.707	.592	.951
11	.749	.534	.405	.326	.755	.402	.075*	.156	.454	.040*	.215
12	.549	.716	.739	.411	.681	.200	.095*	.083*	.990	.967	.698
13	.003*	.996	.824	.735	.367	.051*	.920	.406	.670	.751	.347
14	.381	.540	.387	.884	.993	.984	.403	.417	.948	.417	.402
15	.744	.880	.395	.343	.766	.776	.934	.469	.924	.911	.453
16	.075*	.622	.622	.464	.492	.142	.887	.244	.791	.242	.867
17	.733	.804	.367	.188	.358	.122	.895	.714	1.00	.457	.496

SOURCE: HSFIS application and enrollment forms.

*Statistically different from zero at the .10 level, two-tailed test.

The results indicate that random assignment produced program and control groups with equivalent characteristics. For the full sample, the program and control group differences are statistically significant at the 10 percent level for only 3 of the 47 univariate tests (which is less than the approximately 5 tests that would be expected by chance), and only 4 of the tests are statistically significant at the 15 percent level. Furthermore, the joint test from the multivariate regression model yields a *p*-value of .630. Finally, very few (15 of 207) univariate tests for 12 key variables are rejected at the 10 percent level across the sites, and the significant test statistics are scattered across sites and variables. We conclude that random assignment produced equivalent research groups.

D.2 ASSESSING AND CORRECTING FOR THE EFFECTS OF NONRESPONSE TO THE EARLY HEAD START INTERVIEWS AND ASSESSMENTS

In the previous section, we examined the baseline characteristics of program and control group members in the full analysis sample and concluded that they were similar. However, as discussed in Chapter II, not all sample members completed the follow-up interviews and assessments. The response rate was about 70 percent to the 26-month parent services interview (PSI), 70 percent to the 36-month birthday-related parent interview (PI), and 55 percent to the Bayley and video assessments. Furthermore, response rates differed somewhat across sites and subgroups defined by site and family characteristics at baseline. Thus, it was important to test whether program group members who responded to the interviews are fully representative of all program group members, and whether control group members who responded to the interviews are fully representative of all control group members. Furthermore, it was important to test whether the baseline characteristics of *respondents* in the two research groups differ from each other.

If not corrected, the effects of interview nonresponse could lead to two problems:

1. ***The impact estimates could be biased.*** This would occur if the differences in the average baseline characteristics of respondents in the program and control groups were correlated with the outcome variables, and hence, the impact estimates.
2. ***The impact estimates might not be generalizable to the study population of eligible families.*** This would occur if the differences between interview respondents and nonrespondents were correlated with the outcome variables (regardless of whether or not the average characteristics of program group and control group respondents were similar).

In this appendix, we assess the effects of nonresponse and discuss procedures that we used to adjust for potential nonresponse effects.

1. Assessing the Effects of Nonresponse

Our basic approach for assessing the effects of nonresponse to key data sources was to compare the baseline characteristics of (1) respondents in the program and control groups, and (2) respondents to the full sample of respondents and nonrespondents in each research group. We conducted this analysis using data from the HSFIS application and enrollment forms, and with the same methods that we used to compare the baseline characteristics of the full program and control groups (see Appendix D.1). To keep the presentation manageable, we focus our analysis on the 26-month PSI and the 36-month birthday-related interviews and assessments.[1]

Tables D.2A to D.2D display the following results from the nonresponse analysis, with separate tables displayed for each data source:

1. Variable distributions for interview respondents, by research status
2. Significance levels for tests of differences between the characteristics of respondents in the program and control groups
3. Variable distributions for the full sample of respondents and nonrespondents, by research status
4. Significance levels for tests of differences between respondents and the full sample of respondents and nonrespondents, by research status

We find some differences in the characteristics of respondents and the full sample of respondents and nonrespondents for each research group and data source. Response rates for the program group were higher in center-based programs than in home-based or mixed-approach programs, and response rates for both research groups were higher in "fully implemented" programs than in programs that were not fully implemented. Response rates increased with the

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[1] Analysis results for the 15-month PSI and the 24-month interviews and assessments are presented in Appendix D of our interim impact report, and are very similar to the 36-month results.

TABLE D.2A

COMPARISON OF THE BASELINE CHARACTERISTICS OF RESPONDENTS AND THE FULL SAMPLE OF RESPONDENTS AND NONRESPONDENTS TO THE 26-MONTH PSI, BY RESEARCH STATUS

Variable	Respondents		Respondents and Nonrespondents	
	Program Group	Control Group[a]	Program Group[b]	Control Group[c]
Site Characteristics				
Program Approach				
Center-based	21.4	20.2	20.2	20.6*
Home-based	45.4	44.8	46.7	45.6
Mixed	33.3	35.0	33.0	33.9
Overall Implementation Pattern				
Early implementers	34.0	36.3	34.5*	34.8*
Later implementers	38.1	37.0	35.0	35.1
Incomplete implementers	27.9	26.7	30.5	30.0
Family and Parent Characteristics				
Age of Mother at Birth of Focus Child				
Younger than 20	38.7	38.9	39.0	39.5
20 to 25	32.6	33.4	33.2	32.0
25 or older	28.6	27.8	27.9	28.5
Mother Was Younger than 19 at First Birth	42.1	40.4	42.9	41.2
Highest Grade Completed				
Less than 12	45.8	46.2	47.7*	47.8*
12 or earned a GED	28.2	29.2	27.3	29.8
More than 12	26.0	24.6	24.9	22.4
Race and Ethnicity				
White non-Hispanic	37.2	38.2	37.3*	37.1
Black non-Hispanic	35.3	34.1	34.2	35.0
Hispanic	23.7	22.8	23.8	23.4
Other (Asian or Pacific Islander, American Indian, Eskimo, Aleut)	3.9	4.9	3.9	4.9
Primary Occupation				
Employed	24.3	23.2	37.2	23.8
In school or a training program	22.2	21.0	35.3	21.4
Other	53.5	55.8	23.7	54.7

TABLE D.2.A *(continued)*

Variable	Respondents		Respondents and Nonrespondents	
	Program Group	Control Group^a	Program Group^b	Control Group^c
English Language Ability				
Primary language is English	79.7	78.6	79.9	78.1
Primary language is not English but the applicant speaks English well	9.1	10.5	9.6	10.3
Primary language is not English and the applicant does not speak English well	11.2	10.9	10.5	11.6
Living Arrangements				
Living with a spouse	25.7	26.9	24.9	25.4*
Living with other adults	38.5	40.4	38.3	39.1
Living with no other adults	35.9	32.7	36.8	5.5
Adult Male Present in the Household	39.6	40.8	38.1*	39.1*
Number of Adults in the Household^d				
1	36.8	33.5	37.8	36.6*
2	50.1	53.0	49.8	50.8
3 or more	13.0	13.4	12.4	12.6
Number of Children Less than 5 Years Old in the Household Other than the Focus Child				
0	64.8	63.3	64.3	65.1*
1	26.3	27.9	27.0	26.8
2 or more	8.9	8.9	8.7	8.1
Number of Children Between 6 and 17 in the Household				
0	64.1	66.1	64.3	66.4
1	23.0	21.1	23.1	21.3
2 or more	12.8	12.8	12.6	12.3
Number of Moves in the Past Year				
0	51.1	51.2	49.5*	49.8
1	28.8	27.1	28.9	28.1
2 or more	20.1	21.7	21.6	22.1
Owns Home	12.0	12.0	11.0*	11.1
Household Income as a Percent of the Poverty Level (Percent)				
Less than 33	29.5	28.2	30.2	30.0*
33 to 67	31.7	31.7	32.5	29.2
67 to 99	24.2	26.7	24.0	26.5
100 or more	14.6	13.5	13.3	14.3

TABLE D.2.A *(continued)*

Variable	Respondents		Respondents and Nonrespondents	
	Program Group	Control Group[a]	Program Group[b]	Control Group[c]
Welfare Receipt				
AFDC/TANF[e]	33.1	33.2	35.6*	34.7
Food Stamps	45.7	46.8	48.0*	47.8
Medicaid	75.4	75.0	76.6*	74.7
SSI	6.4	7.1	7.0	7.0
WIC	87.1	86.6	87.5	85.9
Public housing	9.6	9.0	9.5	8.9
Has Inadequate Resources				
Food	4.3	7.4*	4.9*	6.3*
Housing	11.8	12.5	12.3	13.3
Money to buy necessities	20.3	21.5	20.8	21.7
Medical care	12.7	14.5	14.0*	14.7
Transportation	21.1	23.0	20.9	22.4
Child care	34.2	34.8	34.4	34.6
Money for supplies	25.5	30.9*	27.1*	29.4
Support from friends	12.1	12.8	12.9	14.0*
Parent information	12.4	15.2*	12.5	16.3
Maternal Risk Index[f]				
0 or 1 (low risk)	21.0	17.8	19.0*	17.4
2 or 3 (moderate risk)	53.5	56.9	54.2	56.5
4 or 5 (high risk)	25.5	25.2	26.8	26.0
Random Assignment Date				
Before 10/96	35.7	35.4	36.0	36.5
10/96 to 6/97	30.3	32.3	30.2	30.8
After 6/97	34.0	32.2	33.8	32.7
Previously Enrolled in Head Start or Another Childhood Development Program[e]	12.3	14.1	12.8	13.4
Characteristics of Focus Child				
Age (Months)				
Unborn	25.0	27.5	24.2	26.5
Less than 5	34.8	34.2	36.1	34.7
5 or more	40.2	38.3	39.7	38.7
Male	50.7	50.2	51.7	50.4
First Born	62.6	60.6	62.3	62.8*
Birthweight Less than 2,500 Grams[e]	8.9	7.8	9.9	8.4
Born more than 3 Weeks Early[e]	14.8	11.5*	15.8	12.0

TABLE D.2.A *(continued)*

Variable	Respondents		Respondents and Nonrespondents	
	Program Group	Control Group[a]	Program Group[b]	Control Group[c]
Stayed in Hospital After Birth[e]	17.0	15.8	18.3*	16.0
People Concerned About the Child's Overall Health and Development[e]	12.3	14.6	13.0	13.3*
Received an Evaluation Because of Concerns About the Child's Overall Health and Development or Because of Suspected Developmental Delay[e]	5.3	6.4	6.0	6.9
Risk Categories				
Has established risks[e]	11.0	10.5	11.6	10.6
Has biological or medical risks[e]	17.6	16.5	18.3	16.8
Has environmental risks[e]	31.8	38.1*	32.5	36.4*
Covered by Health Insurance[e]	91.3	91.4	90.1*	89.6*
Sample Size	**1,076**	**1,011**	**1,513**	**1,488**

SOURCE: HSFIS application and enrollment forms and 26-month PSI data.

[a] Significance levels are from tests comparing program and control group respondents.

[b] Significance levels are from tests comparing respondents and the full sample of respondents and nonrespondents in the program group.

[c] Significance levels are from tests comparing respondents and the full sample of respondents and nonrespondents in the control group.

[d] The primary caregiver is considered to be an adult regardless of her age.

[e] These variables pertain to families with focus children who were born at baseline.

[f] This index was constructed by summing the number of the following risk factors that the mother faced: (1) being a teenage mother; (2) having no high school credential; (3) receiving public assistance; (4) not being employed or in school or training, and (5) being a single mother.

*Significantly different from zero at the .10 level, two-tailed test.

TABLE D.2B

COMPARISON OF THE BASELINE CHARACTERISTICS OF RESPONDENTS AND THE FULL SAMPLE OF RESPONDENTS AND NONRESPONDENTS TO THE 36-MONTH PI, BY RESEARCH STATUS

	Respondents		Respondents and Nonrespondents	
Variable	Program Group	Control Group[a]	Program Group[b]	Control Group[c]
Site Characteristics				
Program Approach				
Center-based	22.9	21.0	20.2*	20.6
Home-based	45.3	44.7	46.7	45.6
Mixed	31.7	34.3	33.0	33.9
Overall Implementation Pattern				
Early implementers	35.0	35.7	34.5*	34.8*
Later implementers	37.8	36.1	35.0	35.1
Incomplete implementers	27.2	28.2	30.5	30.0
Family and Parent Characteristics				
Age of Mother at Birth of Focus Child				
Younger than 20	37.9	38.7	39.0*	39.5
20 to 25	33.0	32.6	33.2	32.0
25 or older	29.1	28.7	27.9	28.5
Mother Was Younger than 19 at First Birth	42.3	40.6	42.9*	41.2
Highest Grade Completed				
Less than 12	45.3	45.5	47.7*	47.8*
12 or earned a GED	29.2	29.1	27.3	29.8
More than 12	25.5	25.4	24.9	22.4
Race and Ethnicity				
White non-Hispanic	39.6	39.9	37.3*	37.1*
Black non-Hispanic	32.5	33.9	34.2	35.0
Hispanic	23.8	21.6	23.8	23.4
Other (Asian or Pacific Islander, American Indian, Eskimo, Aleut)	4.1	4.6	4.7	4.5
Primary Occupation				
Employed	25.2	23.8	22.9*	23.8
In school or a training program	21.8	20.8	22.0	21.4
Other	52.9	55.4	55.0	54.7

TABLE D.2.B *(continued)*

Variable	Respondents		Respondents and Nonrespondents	
	Program Group	Control Group[a]	Program Group[b]	Control Group[c]
English Language Ability				
Primary language is English	80.2	80.1	79.9	78.1*
Primary language is not English but the applicant speaks English well	8.9	10.2	9.6	10.3
Primary language is not English and the applicant does not speak English well	10.9	9.7	10.5	11.6
Living Arrangements				
Living with a spouse	26.0	27.0	24.9	25.4
Living with other adults	38.4	38.9	38.3	39.1
Living with no other adults	35.6	34.2	36.8	35.5
Adult Male Present in the Household	39.8	40.8	38.1*	39.1*
Number of Adults in the Household[d]				
1	36.8	35.1	37.8	36.6
2	50.3	51.5	49.8	50.8
3 or more	12.9	13.4	12.4	12.6
Number of Children Less than 5 Years Old in the Household Other than the Focus Child				
0	64.7	63.3	64.3	65.1
1	26.8	28.4	27.0	26.8
2 or more	8.5	8.3	8.7	8.1
Number of Children Between 6 and 17 in the Household				
0	63.1	65.6	64.3	66.4
1	24.4	21.3	23.1	21.3
2 or more	12.6	13.0	12.6	12.3
Number of Moves in the Past Year				
0	50.8	51.3	49.5	49.8
1	28.1	27.8	28.9	28.1
2 or more	21.1	20.8	21.6	22.1
Owns Home	12.2	12.3	11.0*	11.1*
Household Income as a Percent of the Poverty Level (Percent)				
Less than 33	29.2	28.0	30.2*	30.0
33 to 67	31.3	30.4	32.5	29.2
67 to 99	25.1	27.4	24.0	26.5
100 or more	14.3	14.1	13.3	14.3

TABLE D.2.B *(continued)*

Variable	Respondents		Respondents and Nonrespondents	
	Program Group	Control Group[a]	Program Group[b]	Control Group[c]
Welfare Receipt				
AFDC/TANF[e]	32.7	33.4	35.6*	34.7
Food Stamps	45.9	46.4	48.0*	47.8
Medicaid	75.8	74.7	76.6	74.7
SSI	6.8	7.2	7.0	7.0
WIC	87.5	86.0	87.5	85.9
Public housing	10.0	8.6	9.5	8.9
Has Inadequate Resources				
Food	4.6	6.9*	4.9	6.3
Housing	11.9	12.1	12.3	13.3*
Money to buy necessities	19.7	20.4	20.8*	21.7*
Medical care	13.4	14.0	14.0	14.7
Transportation	20.7	22.1	20.9	22.4
Child care	33.3	34.2	34.4	34.6
Money for supplies	25.1	30.2*	27.1*	29.4
Support from friends	12.2	11.8	12.9	14.0*
Parent information	12.9	15.4*	12.5	16.3
Maternal Risk Index[f]				
0 or 1 (low risk)	21.2	19.2	19.0*	17.4*
2 or 3 (moderate risk)	54.3	55.9	54.2	56.5
4 or 5 (high risk)	24.5	25.0	26.8	26.0
Random Assignment Date				
Before 10/96	35.3	35.6	36.0*	36.5
10/96 to 6/97	28.5	31.3	30.2	30.8
After 6/97	36.2	33.1	33.8	32.7
Previously Enrolled in Head Start or Another Childhood Development Program[e]	13.1	14.0	12.8	13.4
Characteristics of Focus Child				
Age (Months)				
Unborn	23.9	25.6	24.2	26.5
Less than 5	35.2	35.1	36.1	34.7
5 or more	40.8	39.3	39.7	38.7
Male	51.0	50.1	51.7	50.4
First Born	61.7	60.9	62.3	62.8*
Birthweight Less than 2,500 Grams[e]	9.3	7.3	9.9	8.4*
Born more than 3 Weeks Early[e]	14.8	11.5*	15.8	12.0

TABLE D.2.B *(continued)*

	Respondents		Respondents and Nonrespondents	
Variable	Program Group	Control Group[a]	Program Group[b]	Control Group[c]
Stayed in Hospital After Birth[e]	17.4	16.2	18.3	16.0
People Concerned About the Child's Overall Health and Development[e]	12.7	14.4	13.0	13.3
Received an Evaluation Because of Concerns About the Child's Overall Health and Development or Because of Suspected Developmental Delay[e]	5.5	6.4	6.0	6.9
Risk Categories				
Has established risks[e]	11.6	10.2	11.6	10.6
Has biological or medical risks[e]	17.4	16.9	18.3	16.8
Has environmental risks[e]	31.9	36.6*	32.5	36.4
Covered by Health Insurance[e]	91.4	92.3	90.1*	89.6*
Sample Size	**1,107**	**1,003**	**1,513**	**1,488**

SOURCE: HSFIS application and enrollment forms and 36-month PI data.

[a] Significance levels are from tests comparing program and control group respondents.

[b] Significance levels are from tests comparing respondents and the full sample of respondents and nonrespondents in the program group.

[c] Significance levels are from tests comparing respondents and the full sample of respondents and nonrespondents in the control group.

[d] The primary caregiver is considered to be an adult regardless of her age.

[e] These variables pertain to families with focus children who were born at baseline.

[f] This index was constructed by summing the number of the following risk factors that the mother faced: (1) being a teenage mother;, (2) having no high school credential; (3) receiving public assistance; (4) not being employed or in school or training, and (5) being a single mother.

*Significantly different from zero at the .10 level, two-tailed test.

TABLE D.2C

COMPARISON OF THE BASELINE CHARACTERISTICS OF RESPONDENTS AND THE FULL SAMPLE OF RESPONDENTS AND NONRESPONDENTS TO THE 36-MONTH BAYLEY ASSESSMENT, BY RESEARCH STATUS

	Respondents		Respondents and Nonrespondents	
Variable	Program Group	Control Group[a]	Program Group[b]	Control Group[c]
Site Characteristics				
Program Approach				
Center-based	24.7	22.1	20.2*	20.6
Home-based	45.1	44.9	46.7	45.6
Mixed	30.3	33.0	33.0	33.9
Overall Implementation Pattern				
Early implementers	34.7	38.3	34.5*	34.8*
Later implementers	38.2	35.6	35.0	35.1
Incomplete implementers	27.1	26.2	30.5	30.0
Family and Parent Characteristics				
Age of Mother at Birth of Focus Child				
Younger than 20	38.8	41.0	39.0	39.5
20 to 25	31.4	31.0	33.2	32.0
25 or older	29.8	28.0	27.9	28.5
Mother Was Younger than 19 at First Birth	42.2	43.3	42.9	41.2*
Highest Grade Completed				
Less than 12	46.7	46.6	47.7	47.8
12 or earned a GED	28.1	29.0	27.3	29.8
More than 12	25.1	24.4	24.9	22.4
Race and Ethnicity				
White non-Hispanic	37.8	40.4	37.3*	37.1*
Black non-Hispanic	33.3	31.8	34.2	35.0
Hispanic	25.5	23.3	23.8	23.4
Other (Asian or Pacific Islander, American Indian, Eskimo, Aleut)	3.5	4.5	4.7	4.5
Primary Occupation				
Employed	26.7	23.8	22.9*	23.8
In school or a training program	23.0	21.1	22.0	21.4
Other	50.3	55.1	55.0	54.7

TABLE D.2C *(continued)*

	Respondents		Respondents and Nonrespondents	
Variable	Program Group	Control Group[a]	Program Group[b]	Control Group[c]
English Language Ability				
Primary language is English	79.0	79.6	79.9	78.1
Primary language is not English but the applicant speaks English well	9.6	10.4	9.6	10.3
Primary language is not English and the applicant does not speak English well	11.5	10.0	10.5	11.6
Living Arrangements				
Living with a spouse	24.2	26.2	24.9	25.4
Living with other adults	40.3	39.3	38.3	39.1
Living with no other adults	35.5	34.5	36.8	35.5
Adult Male Present in the Household	39.1	39.4	38.1	39.1
Number of Adults in the Household[d]				
1	36.7	35.6	37.8	36.6
2	49.7	50.6	49.8	50.8
3 or more	13.5	13.8	12.4	12.6
Number of Children Less than 5 Years Old in the Household Other than the Focus Child				
0	65.4	64.3	64.3	65.1
1	26.5	27.1	27.0	26.8
2 or more	8.1	8.6	8.7	8.1
Number of Children Between 6 and 17 in the Household				
0	61.1	64.4	64.3*	66.4
1	25.3	22.0	23.1	21.3
2 or more	13.7	13.5	12.6	12.3
Number of Moves in the Past Year				
0	51.8	50.1	49.5*	49.8
1	28.4	28.4	28.9	28.1
2 or more	19.8	21.4	21.6	22.1
Owns Home	13.1	12.8	11.0*	11.1
Household Income as a Percent of the Poverty Level (Percent)				
Less than 33	29.7	28.0	30.2	30.0
33 to 67	30.6	30.9	32.5	29.2
67 to 99	26.0	28.2	24.0	26.5
100 or more	13.7	13.0	13.3	14.3

TABLE D.2C *(continued)*

Variable	Respondents		Respondents and Nonrespondents	
	Program Group	Control Group[a]	Program Group[b]	Control Group[c]
Welfare Receipt				
AFDC/TANF[e]	33.2	33.6	35.6*	34.7
Food Stamps	45.4	46.0	48.0*	47.8
Medicaid	76.8	75.1	76.6	74.7
SSI	7.4	6.9	7.0	7.0
WIC	88.3	85.6	87.5	85.9
Public housing	10.3	8.6	9.5	8.9
Has Inadequate Resources				
Food	5.2	7.3*	4.9	6.3
Housing	11.9	12.6	12.3	13.3
Money to buy necessities	19.2	20.3	20.8*	21.7
Medical care	14.1	14.1	14.0	14.7
Transportation	21.3	21.6	20.9	22.4
Child care	32.4	33.8	34.4*	34.6
Money for supplies	23.5	32.0	27.1*	29.4*
Support from friends	12.1	11.8	12.9	14.0*
Parent information	12.6	16.3*	12.5	16.3
Maternal Risk Index[f]				
0 or 1 (low risk)	20.6	18.4	19.0*	17.4
2 or 3 (moderate risk)	54.5	55.4	54.2	56.5
4 or 5 (high risk)	24.9	26.1	26.8	26.0
Random Assignment Date				
Before 10/96	34.9	35.8*	36.0*	36.5
10/96 to 6/97	28.1	32.1	30.2	30.8
After 6/97	37.0	32.1	33.8	32.7
Previously Enrolled in Head Start or Another Childhood Development Program[e]	12.8	14.1	12.8	13.4
Characteristics of Focus Child				
Age (Months)				
Unborn	25.1	27.6	24.2	26.5
Less than 5	35.9	35.2	36.1	34.7
5 or more	38.9	37.2	39.7	38.7
Male	49.5	48.8	51.7*	50.4
First Born	61.9	61.2	62.3	62.8
Birthweight Less than 2,500 Grams[e]	8.9	6.6	9.9	8.4*
Born more than 3 Weeks Early[e]	13.7	10.5*	15.8*	12.0

TABLE D.2C *(continued)*

Variable	Respondents		Respondents and Nonrespondents	
	Program Group	Control Group[a]	Program Group[b]	Control Group[c]
Stayed in Hospital After Birth[e]	17.2	15.2	18.3	16.0
People Concerned About the Child's Overall Health and Development[e]	12.3	13.3	13.0	13.3
Received an Evaluation Because of Concerns About the Child's Overall Health and Development or Because of Suspected Developmental Delay[e]	4.7	5.1	6.0*	6.9*
Risk Categories				
Has established risks[e]	10.8	10.4	11.6	10.6
Has biological or medical risks[e]	17.5	16.3	18.3	16.8
Has environmental risks[e]	31.6	36.6*	32.5	36.4
Covered by Health Insurance[e]	91.3	92.3	90.1	89.6*
Sample Size	**879**	**779**	**1,513**	**1,488**

SOURCE: HSFIS application and enrollment forms and 36-month Bayley assessment data.

[a] Significance levels are from tests comparing program and control group respondents.

[b] Significance levels are from tests comparing respondents and the full sample of respondents and nonrespondents in the program group.

[c] Significance levels are from tests comparing respondents and the full sample of respondents and nonrespondents in the control group.

[d] The primary caregiver is considered to be an adult regardless of her age.

[e] These variables pertain to families with focus children who were born at baseline.

[f] This index was constructed by summing the number of the following risk factors that the mother faced: (1) being a teenage mother; (2) having no high school credential; (3) receiving public assistance; (4) not being employed or in school or training, and (5) being a single mother.

*Significantly different from zero at the .10 level, two-tailed test.

TABLE D.2D

COMPARISON OF THE BASELINE CHARACTERISTICS OF RESPONDENTS AND THE FULL SAMPLE OF RESPONDENTS AND NONRESPONDENTS TO THE 36-MONTH VIDEO ASSESSMENT, BY RESEARCH STATUS

	Respondents		Respondents and Nonrespondents	
Variable	Program Group	Control Group[a]	Program Group[b]	Control Group[c]
Site Characteristics				
Program Approach				
Center-based	26.0	23.1	20.2*	20.6*
Home-based	45.3	44.4	46.7	45.6
Mixed	28.7	32.5	33.0	33.9
Overall Implementation Pattern				
Early implementers	35.0	37.1	34.5*	34.8*
Later implementers	39.8	37.6	35.0	35.1
Incomplete implementers	25.2	25.3	30.5	30.0
Family and Parent Characteristics				
Age of Mother at Birth of Focus Child				
Younger than 20	37.9	40.3	39.0	39.5
20 to 25	32.8	30.9	33.2	32.0
25 or older	29.3	28.8	27.9	28.5
Mother Was Younger than 19 at First Birth	42.1	42.5	42.9	41.2
Highest Grade Completed				
Less than 12	47.0	46.3	47.7	47.8*
12 or earned a GED	29.3	28.1	27.3	29.8
More than 12	23.8	25.6	24.9	22.4
Race and Ethnicity				
White non-Hispanic	38.9	40.0	37.3*	37.1*
Black non-Hispanic	31.6	31.8	34.2	35.0
Hispanic	26.1	23.7	23.8	23.4
Other (Asian or Pacific Islander, American Indian, Eskimo, Aleut)	3.4	4.5	4.7	4.5
Primary Occupation				
Employed	26.5	25.0	22.9*	23.8
In school or a training program	22.9	20.5	22.0	21.4
Other	50.6	54.6	55.0	54.7

TABLE D.2D *(continued)*

	Respondents		Respondents and Nonrespondents	
Variable	Program Group	Control Group[a]	Program Group[b]	Control Group[c]
English Language Ability				
Primary language is English	79.1	79.0	79.9	78.1*
Primary language is not English but the applicant speaks English well	9.5	11.4	9.6	10.3
Primary language is not English and the applicant does not speak English well	11.4	9.6	10.5	11.6
Living Arrangements				
Living with a spouse	25.3	27.3	24.9*	25.4*
Living with other adults	40.7	40.1	38.3	39.1
Living with no other adults	34.0	32.7	36.8	35.5
Adult Male Present in the Household	40.2	41.2	38.1*	39.1*
Number of Adults in the Household[d]				
1	35.2	33.5	37.8*	36.6*
2	51.3	51.7	49.8	50.8
3 or more	13.5	14.7	12.4	12.6
Number of Children Less than 5 Years Old in the Household Other than the Focus Child				
0	64.5	63.9	64.3	65.1
1	27.2	27.7	27.0	26.8
2 or more	8.2	8.5	8.7	8.1
Number of Children Between 6 and 17 in the Household				
0	62.0	64.3	64.3*	66.4
1	24.3	22.3	23.1	21.3
2 or more	13.7	13.4	12.6	12.3
Number of Moves in the Past Year				
0	51.4	50.2	49.5*	49.8
1	29.5	28.5	28.9	28.1
2 or more	19.0	21.3	21.6	22.1
Owns Home	12.9	12.4	11.0*	11.1
Household Income as a Percent of the Poverty Level (Percent)				
Less than 33	28.3	27.0	30.2*	30.0
33 to 67	30.6	30.7	32.5	29.2
67 to 99	26.9	28.1	24.0	26.5
100 or more	14.2	14.2	13.3	14.3

TABLE D.2D *(continued)*

Variable	Respondents		Respondents and Nonrespondents	
	Program Group	Control Group[a]	Program Group[b]	Control Group[c]
Welfare Receipt				
AFDC/TANF[e]	33.2	31.3	35.6*	34.7*
Food Stamps	45.7	44.5	48.0*	47.8*
Medicaid	76.1	74.6	76.6	74.7
SSI	8.1	6.6	7.0*	7.0
WIC	88.6	85.5*	87.5	85.9
Public housing	10.6	8.4	9.5*	8.9
Has Inadequate Resources				
Food	4.6	7.1*	4.9	6.3
Housing	11.4	12.5	12.3	13.3
Money to buy necessities	19.5	19.7	20.8	21.7*
Medical care	13.8	15.1	14.0	14.7
Transportation	20.1	22.0	20.9	22.4
Child care	33.1	33.1	34.4	34.6
Money for supplies	24.5	30.9*	27.1*	29.4
Support from friends	11.9	11.2	12.9	14.0*
Parent information	13.1	15.9	12.5	16.3
Maternal Risk Index[f]				
0 or 1 (low risk)	21.2	19.3	19.0*	17.4
2 or 3 (moderate risk)	53.7	56.0	54.2	56.5
4 or 5 (high risk)	25.1	24.7	26.8	26.0
Random Assignment Date				
Before 10/96	34.9	35.2	36.0*	36.5
10/96 to 6/97	27.6	31.6	30.2	30.8
After 6/97	37.5	33.2	33.8	32.7
Previously Enrolled in Head Start or Another Childhood Development Program[e]	12.7	13.9	12.8	13.4
Characteristics of Focus Child				
Age (Months)				
Unborn	25.1	26.5	24.2	26.5
Less than 5	34.8	36.0	36.1	34.7
5 or more	40.2	37.5	39.7	38.7
Male	50.7	49.7	51.7	50.4
First Born	61.8	61.7	62.3	62.8
Birthweight Less than 2,500 Grams[e]	9.1	7.8	9.9	8.4
Born more than 3 Weeks Early[e]	13.5	11.6	15.8*	12.0

TABLE D.2D *(continued)*

	Respondents		Respondents and Nonrespondents	
Variable	Program Group	Control Group[a]	Program Group[b]	Control Group[c]
Stayed in Hospital After Birth[e]	16.7	16.6	18.3	16.0
People Concerned About the Child's Overall Health and Development[e]	12.0	14.6	13.0	13.3
Received an Evaluation Because of Concerns About the Child's Overall Health and Development or Because of Suspected Developmental Delay[e]	5.4	6.9	6.0	6.9
Risk Categories				
Has established risks[e]	11.2	9.9	11.6	10.6
Has biological or medical risks[e]	16.8	16.0	18.3	16.8
Has environmental risks[e]	30.6	36.0*	32.5	36.4
Covered by Health Insurance[e]	91.4	91.8	90.1*	89.6*
Sample Size	**874**	**784**	**1,513**	**1,488**

SOURCE: HSFIS application and enrollment forms and 36-month video assessment data.

[a] Significance levels are from tests comparing program and control group respondents.

[b] Significance levels are from tests comparing respondents and the full sample of respondents and nonrespondents in the program group.

[c] Significance levels are from tests comparing respondents and the full sample of respondents and nonrespondents in the control group.

[d] The primary caregiver is considered to be an adult regardless of her age.

[e] These variables pertain to families with focus children who were born at baseline.

[f] This index was constructed by summing the number of the following risk factors that the mother faced: (1) being a teenage mother; (2) having no high school credential; (3) receiving public assistance; (4) not being employed or in school or training, and (5) being a single mother.

*Significantly different from zero at the .10 level, two-tailed test.

education level of the primary caregiver. In addition, they were higher if the primary caregiver (1) was employed at the time of random assignment (for the program group), (2) was married or living with other adults, and (3) was receiving welfare. Response rates were also slightly higher for whites than for African Americans and Hispanics for some data sources, and for those randomly assigned later than earlier. The *p*-values to test the hypotheses that variable means and distributions are *jointly* similar are less than .01 for all data sources and for both research groups (Table D.2E). These results suggest that program group respondents are not fully representative of the full program group, and that control group respondents are not fully representative of the full control group.

However, we find fewer differences between the baseline characteristics of program and control group *respondents*. Very few of the differences in the distributions of the baseline variables for respondents in the two research groups are statistically significant. For example, the program and control group differences are statistically significant at the 10 percent level for only 6 of the 48 univariate tests for the 36-month Bayley assessment (which is close to the approximately 5 tests that would be expected by chance). Similarly, only 4 of the tests for the 36-month video assessment, 4 for the 36-month PI, and 5 for the 26-month PSI are statistically significant at the 10 percent level. Furthermore, *none* of the joint tests from the multivariate regression models is statistically significant at the 10 percent level (Table D.2E). Finally, very few univariate tests for key variables are rejected at the 10 percent level across the sites, and the significant test statistics are scattered across sites and variables (not shown).

In sum, we find some differences in the characteristics of respondents and nonrespondents, but these differences are not large and, in most instances, are similar for both the program and the control groups. Consequently, the characteristics of respondents in the two research groups are similar, which suggests that our impact estimates are likely to be unbiased.

TABLE D.2E

P-VALUES FROM JOINT TESTS COMPARING THE BASELINE CHARACTERISTICS OF INTERVIEW RESPONDENTS AND NONRESPONDENTS, BY DATA SOURCE

(Percentages)

	Respondents Versus the Full Sample of Respondents and Nonrespondents		
Data Source	Program Group	Control Group	Program Group Respondents Versus Control Group Respondents
Parent Service Interviews (PSIs)			
6-Month	.08*	<.01***	.82
15-Month	.03**	.03**	.50
26-Month	.03**	<.01***	.80
Parent Interviews (PIs)			
14-Month	<.01***	<.01***	.93
24-Month	<.01***	<.01***	.60
36-Month	<.01***	<.01***	.93
All three	<.01***	<.01***	.88
Bayley Assessments			
14-Month	<.01***	<.01***	.93
24-Month	<.01***	<.01***	.19
36-Month	<.01***	.07*	.79
All three	<.01***	<.01***	.76
Video Assessments			
14-Month	<.01***	<.01***	.93
24-Month	<.01***	<.01***	.37
36-Month	<.01***	.04**	.58
All three	<.01***	<.01***	.68

SOURCE: HSFIS application and enrollment forms.

*Statistically different from zero at the .10 level, two-tailed test.
**Statistically different from zero at the .05 level, two-tailed test.
***Statistically different from zero at the .01 level, two-tailed test.

2. Adjusting for the Effects of Nonresponse

As discussed in Chapter II of this report, the main approach we used to adjust for observed differences between program and control group respondents was to estimate program impacts using regression models. In these models, we regressed outcome variables on a program status indicator variable and a large number of explanatory variables. The explanatory variables were constructed using HSFIS data and pertain to the characteristics of families and children at baseline. An important criterion that we used to select the explanatory variables was that they should capture differences between the characteristics of respondents in the two research groups. Furthermore, to adjust for differences in response rates across sites, we assigned equal weight to each site in the analysis.

We believe that our regression approach produced unbiased estimated impacts because there were no large differences between respondents in the two research groups, and because the regression models controlled for some of these differences. However, the regression procedure does not correct for differences between respondents and nonrespondents in each research group; thus, the estimated impacts may not be generalizable to the full study population.

To address this problem, we constructed sample weights so that the weighted observable baseline characteristics of respondents were similar to the baseline characteristics of the full sample of respondents and nonrespondents. For each survey instrument, we constructed separate weights for program and control group members using the following three steps:

1. ***We estimated a logit model predicting interview response.*** The binary variable indicating whether or not a family was a respondent to the instrument was regressed on the full set of HSFIS variables used in the nonresponse analysis discussed above, as well as site indicator variables. Only HSFIS variables that were statistically

significant predictors of response status were retained as explanatory variables in the models.[2]

2. ***We calculated a propensity score for each family in the full sample.*** We constructed this score, the predicted probability that a family was a respondent, using the parameter estimates from the logit regression model and the family's HSFIS characteristics. Families with large propensity scores were likely to be respondents, whereas families with small propensity scores were likely to be nonrespondents.

3. ***We constructed nonresponse weights using the propensity scores.*** Families were ranked by the size of their propensity scores and were divided into six groups of equal size. The weight for a family was inversely proportional to the mean propensity score of the group the family was assigned to.[3]

This propensity score procedure yielded large weights for families with characteristics that were associated with low response rates (that is, for those with small propensity scores). Similarly, the procedure yielded small weights for families with characteristics that were associated with high response rates. Thus, the weighted characteristics of respondents were similar, on average, to the characteristics of the entire research sample.

As discussed in Chapter II, our main procedure was *not* to include these weights in the regression models when estimating impacts per eligible applicant and per participant. The use of these weights correctly adjusts for nonresponse bias when impacts are estimated with a simple differences-in-means estimation approach. However, using weights does not correctly adjust for nonresponse bias in a regression context, because the regression-adjusted impact estimates are not weighted correctly (DuMouchel and Duncan 1983).

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[2] We estimated the logit models using the full sample rather than by site, so that we could include many more HSFIS variables and obtain more precise parameter estimates.

[3] The nonresponse weight for a family could be defined to be inversely proportional to that family's actual propensity score. However, families were divided into six groups to "smooth" the weights. The theoretical properties of the smoothed weights can be shown to be superior to those of the unsmoothed weights.

To check the robustness of study findings, we did estimate the regression models using the sample weights (see Appendix D.4). In addition, we used weights when estimating impacts using a simple differences-in-means approach (see Appendix D.4). These differences-in-means impact estimates should be unbiased and generalizable to the study population (although they are less precise than the regression-adjusted impact estimates). We inflated the standard errors of the weighted impact estimates to account for design effects due to weighting.

It is important to note that the use of weights and regression models adjusts only for *observable* differences between survey respondents and nonrespondents in the two research groups. The procedure does not adjust for potential unobservable differences between the groups. Thus, our procedures only partially adjust for potential nonresponse bias.

D.3 ESTIMATING IMPACTS PER PARTICIPANT

The comparison of the average outcomes of all program and all control group members yields unbiased estimates of program impacts for eligible applicants, because random assignment was performed at the point that applicant families were determined to be eligible for Early Head Start services. In Chapter II, we described our methods for obtaining regression-adjusted impacts per eligible applicant. However, some eligible families in the program group decided not to participate in the program after random assignment. This appendix describes the procedures that we used to obtain unbiased impact estimates for those who actually received some services (that is, for program *participants*).[4]

We used a two-step procedure to estimate impacts per participant for both the global and the targeted analyses. First, for each site, we divided the regression-adjusted impacts per eligible applicant by the site's program group participation rate (Bloom 1984). Second, we averaged these site-specific impact estimates, giving equal weight to each site.

To illustrate how this procedure generates unbiased impact estimates for participants, we express the impact per eligible applicant on a given outcome in a site as a weighted average of the program impact for those eligible applicants who would participate in Early Head Start, given the chance, and the program impact for those who would not participate, with weights p_s and $(1-p_s)$, respectively. In mathematical terms:

$$(1)\ I_{Es} = p_s * I_{Ps} + (1-p_s) * I_{Ns},$$

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[4] Our definition of a program participant was discussed in Chapter II.

where I_{Es} is the impact per eligible applicant in site s, I_{Ps} is the impact per participant (that is, the difference between the average outcome of program and control group members who would participate in Early Head Start if given the chance), and I_{Ns} is the impact per nonparticipant (that is, the difference between the average outcome of program and control group members who would not participate if given the chance).

We do not know which control group families would have participated if they had instead been assigned to the program group, or which control group members would not have participated. However, this information is not necessary if we assume that all impacts were due to those who participated in Early Head Start, and that the *impacts on nonparticipants were zero* (that is, $I_{Ns} = 0$). Under this assumption (or "exclusion restriction"), the impact per participant in a site can be calculated by dividing the impact estimate per eligible applicant (that is, those based on *all* program and control group members) by the proportion of program group members who participated in Early Head Start. In mathematical terms:

$$(2)\ I_{P_s} = \frac{I_{E_s}}{p_s}.$$

Our estimate of the impact per participant across all sites is the simple average of the site-specific impacts per participant (that is, the average of I_{Ps} over all sites). The standard errors of these impacts are larger than those for the impacts per eligible applicant, because the standard errors for the impacts per participant need to account for the estimation error in the site participation rates.

To make this procedure operational, we used PROC SYSLIN in the SAS statistical software package to estimate the following system of equations, using two-stage least-squares (instrumental variable) estimation techniques:

$$(3)\quad S_j * P = \delta_j S_j * T \ + \ u_j$$

$$(4)\quad y = \sum_j \alpha_j (S_j * P) + X\beta + \varepsilon,$$

where S_j is an indicator variable equal to 1 if the family is in site j, P is an indicator variable equal to 1 if the program group family participated in Early Head Start (and is 0 for control group families and program group nonparticipants), T is an indicator variable equal to 1 if the family is in the program group, y is an outcome variable, X are explanatory variables (that include site indicator variables), ε and the u_js are mean zero disturbance terms, and δ_j, α_j, and β are parameters to be estimated.

In the first-stage regressions, we obtained estimates of δ_j in equation (3) for each site j. These estimates were the program group participation rates in each site.[5] In the second-stage regression, we estimated equation (4) where the predicted values from the first-stage regressions were used in place of the S_j*P interaction terms. In this formulation, the estimate of α_j from the second-stage regression represents the impact estimate per participant in site j. The standard errors of these estimates were corrected for the estimation error from the first-stage regressions.[6]

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[5] We also estimated models that included other explanatory variables (that is, that included the X variables in equation [4]). These models did not change the results and so, for simplicity, were not adopted.

[6] This procedure uses the treatment status indicator variable (T) as an "instrument" for the program participation indicator variable (P) in each site. This is a valid instrument, because T is correlated with P but is uncorrelated with the disturbance term ε due to random assignment. The instrumental variable estimates of the impacts per participant are identical to the estimates using the Bloom procedure described above (Angrist et al. 1996).

D.4 ASSESSING THE ROBUSTNESS OF STUDY FINDINGS

As discussed in Chapter II, Early Head Start impacts on child, parent, and family outcomes were estimated (1) using regression models to control for baseline differences between the program and control groups; (2) giving equal weight to each site; (3) not using weights to adjust for nonresponse; and (4) using the maximum sample for each outcome variable (that is, using the full sample for whom the outcome variable could be constructed). This appendix addresses the following important question: Are the impact estimates sensitive to alternative estimation strategies, weighting schemes, or sample definitions?

To test the robustness of study findings, we also estimated global impacts under the following scenarios:

1. ***Using Simple Differences-in-Means Estimation Techniques.*** Our main estimation approach was to use regression models to estimate program impacts. However, we also estimated impacts by simply comparing the mean outcomes of the program and control groups, and used t-tests to gauge the statistical significance of the estimated impacts.
2. ***Using Weights to Adjust for Nonresponse.*** As discussed in Appendix D.2, we constructed weights to adjust for potential bias in the impact estimates due to interview nonresponse. The use of these weights correctly adjusts for nonresponse using the simple differences-in-means estimation methods. Although there is no theoretical reason to use these weights in a regression context, we did include them in some models to examine how the results would change.
3. ***Weighting Each Site by Its Sample Size.*** Our main approach was to weight each site equally in the analysis regardless of sample size, because the intervention varied substantially across programs and was administered at the site level. However, we also estimated models where sites with larger sample sizes (response rates) were given larger weights than sites with smaller sample sizes (response rates). For these models, we simply pooled all observations across all sites.
4. ***Using Alternative Sample Definitions.*** Our main approach was to estimate impacts using all sample members for whom outcome measures were available. However, we also estimated impacts using alternative sample definitions: those who (1) completed a particular instrument at all three data collection points (which is the sample that was used in the growth curve analysis); (2) completed the 26-month PSI *and* the particular 36-month birthday-related instrument (so that the impacts on service use and receipt could be directly linked to the impacts on the child, parent, and family outcomes); and (3) completed the 24-month PI and the particular 36-month birthday-related instrument (which is the sample that was used in the mediated analysis).

5. ***Dropping Sites with Low Response Rates.*** We estimated impacts after dropping sample members from three sites with the lowest response rates, because interview respondents in these sites may not be representative of the full samples or respondents and nonrespondents in these sites.

We estimated impacts on 28 key child, parenting, and family outcomes constructed using the 36-month birthday-related instruments and the 26-month PSIs.

Our results indicate that our main global impact findings are very robust to alternative estimation strategies, weighting schemes, and sample definitions (Tables D.4A and D.4B). The regression results are very similar whether or not we use nonresponse weights and whether we weight sites equally or by their sample sizes. Interestingly, the differences-in-means estimates are very similar to the regression ones, because as discussed, the baseline characteristics of interview respondents in the two research groups are similar. The same set of policy conclusions can be drawn using impact results from the alternative sample definitions. Finally, the results do not change substantially when we drop the three sites with the lowest response rates.

In sum, we believe that our impact findings represent real effects and are not due to our methodological assumptions.

TABLE D.4A

IMPACT ESTIMATES PER PARTICIPANT FOR THE FULL SAMPLE ON KEY 36-MONTH OUTCOME VARIABLES USING ALTERNATIVE ESTIMATION AND WEIGHTING STRATEGIES

	Regression-Adjusted Estimates			Differences-in-Means Estimates		
Variable	Sites Weighted Equally, No Weights for Nonresponse (Benchmark)	Sites Weighted Equally, Weights for Nonresponse	Sites Weighted by Sample Size, Weights for Nonresponse	Sites Weighted Equally, No Weights for Nonresponse	Sites Weighted Equally, Weights for Nonresponse	Sites Weighted by Sample Size, Weights for Nonresponse
Bayley Mental Development Index (MDI) Standard Score	1.55**	1.50**	1.54**	1.36**	1.49**	1.40**
Percentage with MDI <85	-4.69*	-4.33*	-3.55	-4.27*	-3.65	-4.18*
PSI: Parental Distress	-0.73	-0.77	-0.64	-0.68	-0.64	-0.70
Center for Epidemiologic Studies Depression Scale (CES-D) Total Score	-0.26	-0.20	-0.08	-0.24	-0.07	-0.11
Percentage of Parents Who Spanked the Child in the Previous Week	-7.09***	-6.92***	-7.12***	-6.94***	-6.67***	-6.42***
Index of Severity of Discipline Strategies	-0.18**	-0.16**	-0.17**	-0.16**	-0.16**	-0.14*
Percentage of Parents Who Read to Their Child Every Day	4.85**	4.59*	4.46*	4.22*	4.37*	4.37*
Percentage of Parents Suggesting Only Mild Responses to Hypothetical Situations	-0.18**	-0.16**	-0.17**	-0.16**	-0.16**	-0.14**
Home Observation for Measurement of the Environment (HOME): Total Score	0.53**	0.55**	0.58**	0.60**	0.59**	0.57**

TABLE D.4A *(continued)*

Variable	Regression-Adjusted Estimates: Sites Weighted Equally, No Weights for Nonresponse (Benchmark)	Regression-Adjusted Estimates: Sites Weighted Equally, Weights for Nonresponse	Regression-Adjusted Estimates: Sites Weighted by Sample Size, Weights for Nonresponse	Differences-in-Means Estimates: Sites Weighted Equally, No Weights for Nonresponse	Differences-in-Means Estimates: Sites Weighted Equally, Weights for Nonresponse	Differences-in-Means Estimates: Sites Weighted by Sample Size, Weights for Nonresponse
HOME: Support of Language and Learning	0.21**	0.22**	0.26***	0.25**	0.28***	0.26**
HOME: Warmth	0.08*	0.09**	0.08**	0.08*	0.08*	0.09**
Parent Supportiveness (Semistructured Play)	0.14***	0.13***	0.12**	0.12**	0.12**	0.12**
Parent Intrusiveness (Semistructured Play)	-0.04	-0.04	-0.04	-0.03	-0.05	-0.04
Parent Detachment (Semistructured Play)	-0.06*	-0.06*	-0.05	-0.05	-0.05	-0.05
Parent Engagement (Semistructured Play)	0.21***	0.21***	0.19***	0.19***	0.19***	0.19***
Sustained Attention with Objects (Semistructured Play)	0.16***	0.15***	0.16***	0.15***	0.16***	0.15***
Negativity Toward Parent (Semistructured Play)	-0.08**	-0.08**	-0.07**	-0.07**	-0.07**	-0.07**
Persistence (Puzzle Challenge Task)	0.07	0.05	0.07	0.05	0.06	0.04
Child Behavior Checklist: Aggressive Behavior	-0.69**	-0.65*	-0.52	-0.55	-0.44	-0.53
Peabody Picture Vocabulary Test (PPVT-III) Standard Score	2.13**	1.97**	1.65*	2.08**	1.52*	1.96**
Percentage with PPVT <85	-6.02**	-6.05**	-5.86**	-5.22*	-5.25*	-5.24*
Percentage of Caregivers Ever Employed During the 26 Months After Random Assignment	3.38*	3.24*	2.96*	3.93**	3.29*	3.70**

TABLE D.4A *(continued)*

Variable	Regression-Adjusted Estimates			Differences-in-Means Estimates		
	Sites Weighted Equally, No Weights for Nonresponse (Benchmark)	Sites Weighted Equally, Weights for Nonresponse	Sites Weighted by Sample Size, Weights for Nonresponse	Sites Weighted Equally, No Weights for Nonresponse	Sites Weighted Equally, Weights for Nonresponse	Sites Weighted by Sample Size, Weights for Nonresponse
Percentage of Caregivers Ever in an Education or Training Program During the 26 Months After Random Assignment	8.61***	8.85***	8.92***	9.37***	9.73***	10.01***
Average Parent-Reported Health Status of Child	-0.02	-0.02	-0.01	-0.01	0.00	-0.00
Continuous Biological Father Presence Child Age 14 to 36 Months	-0.68	-0.39	-1.58	-1.80	-3.01	-1.55
Continuous Male Presence Child Age 14 to 36 Months	-3.26	-2.81	-4.06**	-4.25**	-4.93**	-3.98*

SOURCE: PSI and PI data and Bayley and video assessments.

*Significantly different than zero at the .10 level, two-tailed test
**Significantly different than zero at the .05 level, two-tailed test
***Significantly different than zero at the .01 level, two-tailed test

TABLE D.4B

IMPACT ESTIMATES PER PARTICIPANT FOR THE FULL SAMPLE ON KEY 36-MONTH OUTCOME VARIABLES USING ALTERNATIVE SAMPLE DEFINITIONS

Variable	Completed the Relevant 36-Month or 26-Month Instrument (Benchmark)	Completed the Relevant Instrument at All Three Data Collection Points (Growth Curve Analysis Sample)	Completed the 26-Month PSI as well as the Relevant Instrument	Completed the 36-Month PI as well as the Relevant Instrument (Mediated Analysis Sample)	Completed the Relevant Interview and Dropped 3 Sites with the Lowest Response Rates
Bayley Mental Development Index (MDI) Standard Score	1.55**	1.67**	1.69**	1.99***	1.34*
Percentage with MDI <85	-4.69*	-8.45***	-5.96**	-6.02**	-3.52
PSI: Parental Distress	-0.73	-1.23**	-0.84	-1.15**	-0.77
Center for Epidemiologic Studies Depression Scale (CES-D) Total Score	-0.26	-0.20	-0.48	-0.36	-0.52
Percentage of Parents Who Spanked the Child in the Previous Week	-7.09***	-8.20***	-7.44***	-7.83***	-8.93***
Index of Severity of Discipline Strategies	-0.18**	-0.17**	-0.16**	-0.18**	-0.23***
Percentage of Parents Suggesting Only Mild Responses to Hypothetical Situations	4.19*	4.09*	3.69	4.35*	5.92**
Percentage of Parents Who Read to Their Child Every Day	4.85**	6.67**	5.08*	6.20**	4.98*
Home Observation for Measurement of the Environment (HOME): Total Score	0.53**	0.75***	0.67***	0.75***	0.41*

TABLE D.4.B *(continued)*

Variable	Completed the Relevant 36-Month or 26-Month Instrument (Benchmark)	Completed the Relevant Instrument at All Three Data Collection Points (Growth Curve Analysis Sample)	Completed the 26-Month PSI as well as the Relevant Instrument	Completed the 36-Month PI as well as the Relevant Instrument (Mediated Analysis Sample)	Completed the Relevant Interview and Dropped 3 Sites with the Lowest Response Rates
HOME: Support of Language and Learning	0.21**	0.28***	0.27***	0.31***	0.13
HOME: Warmth	0.08*	0.07	0.09**	0.07*	0.07
Parent Supportiveness (Semistructured Play)	0.14***	0.20***	0.12**	0.19***	0.11**
Parent Intrusiveness (Semistructured Play)	-0.04	0.00.	-0.04	-0.06	0.00
Parent Detachment (Semistructured Play)	-0.06*	-0.08*	-0.04	-0.08**	-0.03
Parent Engagement (Semistructured Play)	0.21***	0.20***	0.21***	0.27***	0.16**
Sustained Attention with Objects (Semistructured Play)	0.16***	0.12*	0.15***	0.21***	0.10*
Negativity Toward Parent (Semistructured Play)	-0.08**	-0.06	-0.11***	-0.10***	-0.08**
Persistence (Puzzle Challenge Task)	0.07	-0.00	0.05	0.12*	-0.05
Child Behavior Checklist: Aggressive Behavior	-0.69**	-0.61*	-0.74**	-0.66*	-0.87**
Peabody Picture Vocabulary Test (PPVT-III) Standard Score	2.13**	2.78***	2.21**	2.77***	2.39**
Percentage with PPVT <85	-6.02**	-8.63***	-5.26*	-9.27***	-5.52*

TABLE D.4.B *(continued)*

Variable	Completed the Relevant 36-Month or 26-Month Instrument (Benchmark)	Completed the Relevant Instrument at All Three Data Collection Points (Growth Curve Analysis Sample)	Completed the 26-Month PSI as well as the Relevant Instrument	Completed the 36-Month PI as well as the Relevant Instrument (Mediated Analysis Sample)	Completed the Relevant Interview and Dropped 3 Sites with the Lowest Response Rates
Percentage of Caregivers Ever Employed During the 26 Months After Random Assignment	3.38*	2.77	3.38*	3.38*	2.63
Percentage of Caregivers Ever in an Education or Training Program During the 26 Months After Random Assignment	8.61***	9.22***	8.61***	8.61***	7.36***
Average Parent-Reported Health Status of Child	-0.02	-0.01	-0.01	-0.00	0.00
Continuous Biological Father Presence Child Age 14 to 36 Months	-0.68	-0.68	0.83	-0.68	-0.30
Continuous Male Presence Child Age 14 to 36 Months	-3.26	-3.26	-1.72	-3.26	-3.72

SOURCE: PSI and PI data and Bayley and video assessments.

NOTE: All estimates were calculated using regression models where each site was weighted equally and where weights for nonresponse were not used.

*Significantly different than zero at the .10 level, two-tailed test
**Significantly different than zero at the .05 level, two-tailed test
***Significantly different than zero at the .01 level, two-tailed test

D.5 RESULTS FROM THE GROWTH CURVE ANALYSIS

As discussed in Chapter II, in addition to our basic point-in-time analysis, we used longitudinal statistical methods (or, more specifically, growth curve or hierarchical linear modeling) to estimate the effects of Early Head Start participation on child and family outcomes that were measured when the focus children were, on average, 15, 25, and 37 months old. These methods were used to examine impacts (program and control group differences) on the growth trajectories of child and family outcomes during the follow-up period.

In our context, the growth curve approach can be considered a two-stage process. First, a regression line is fit through the three data points for *each* program and control group member, and second, impacts are obtained on these estimated intercepts and slopes. For each outcome measure, the growth curve approach produces an overall regression line for the program group (defined by the mean estimated intercept and mean estimated slope across all program group members) and, similarly, an overall regression line for the control group. The difference between these overall regression lines at any given time point yields a point-in-time impact estimate.[7]

The sample for the growth curve analysis included only those sample members who completed interviews and assessments at every time point. The sample for the basic point-in-time analysis, however, used all available data at each time point.[8]

Several criteria were used to select the child and family outcomes for the growth curve analysis. First, we only selected outcomes that were measured at *each* birthday-related interview or assessment. Second, we selected outcomes that are continuous variables. We excluded binary and categorical variables, because it is difficult to interpret growth for these variables at the individual level. Finally, we excluded outcomes that were age-normed (for example, the Bayley MDI). Eleven outcome variables met the criteria for inclusion in the growth curve analyses.

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[7] As discussed in Chapter II, the growth curve models were estimated in one stage rather than two, for efficiency reasons.

[8] Another difference between the two approaches is that, because of analytic complications, sites were weighted by their sample sizes using the growth curve approach (that is, observations across sites were pooled), whereas sites were weighted equally using the basic point-in-time

Tables D.5A and D.5B display results from the growth curve analysis. Table D.5A displays the estimated intercepts and slopes (growth rates) for program and control group members, as well as impacts on these intercepts and slopes. The parameters of the growth curve models were scaled so that the estimated intercepts represent average outcomes when the focus children were 15 months old. Hence, the estimated slopes represent the extent to which the outcomes changed per month between the time the focus children were 15 and 37 months old.

Table D.5B displays differences between the fitted lines for the program and control groups (that is, impacts on the outcomes) evaluated at the 15-, 25-, and 37-month points. The table also displays the corresponding impact estimates obtained using the basic point-in-time approach. As expected (see Chapter II), the two sets of impacts are generally similar (and especially so for the 37-month outcomes). Thus, as discussed in Chapter V of Volume I, the two approaches yield the same policy conclusions about the effects of Early Head Start on key child and family outcomes.

In Figures D.5A through D.5K, we display the changes over time in the variables documented in the tables. In Chapter V of Volume I, we discuss these findings in the context of the other impact analyses.

(continued)

approach. However, as shown in the sensitivity analysis in Appendix D.4, the impact results using the basic point-in-time approach are very similar using the two weighting schemes.

TABLE D.5A

ESTIMATED INTERCEPTS AND SLOPES FOR CHILD AND FAMILY OUTCOMES FROM THE GROWTH CURVE MODELS, BY RESEARCH STATUS

	Estimated Intercept: Average Outcome at 15 Months			Estimated Slope: Growth Between 15 and 37 Months		
Variable	Program Group	Control Group	Impact Per Eligible Applicant	Program Group	Control Group	Impact Per Eligible Applicant
Child Engagement (Semistructured Play)	3.927	3.835	0.092	0.0399	0.0347	0.0026
Child Negativity Toward Parent (Semistructured Play)	2.089	2.115	-0.026	-0.0381	-0.0358	-0.0023
Child Sustained Attention with Objects (Semistructured Play)	5.025	4.946	0.080	-0.0016	-0.0044	0.0028
Parental Supportiveness (Semistructured Play)	4.065	3.976	0.089*	-0.0015	-0.0022	0.0007
Parent-Child Activities (HOME)	4.506	4.504	0.001	-0.0023	-0.0049	0.0027
Parent Detachment (Semistructured Play)	1.534	1.625	-0.091**	-0.0142	-0.0168	0.0026
Parent Intrusiveness (Semistructured Play)	2.365	2.430	-0.065	-0.0397	-0.0409	0.0012
Negative Regard	1.474	1.455	0.018	-0.0077	-0.0065	-0.0012
PSI: Parental Distress	26.432	27.263	-0.831*	-0.0907	-0.0865	-0.0041
PSI: Parent-Child Dysfunctional Interaction	17.165	17.466	-0.301	0.0095	0.0060	0.0035
Family Conflict Scale (FES)	1.745	1.704	0.040	-0.0036	-0.0007	-0.0029*
Sample Size[c]						
Parent Interview	**898**	**802**	**1,700**	**898**	**802**	**1,700**
Bayley	**559**	**485**	**1,044**	**559**	**485**	**1,044**
Video	**617**	**551**	**1,168**	**617**	**551**	**1,168**

SOURCE: Parent interview and child assessments.

NOTE: All estimates were calculated using growth curve models. Generalized least squares techniques were used to estimate the regression models where the explanatory variables included a treatment status indicator variable, a variable signifying the age of the child at the interview or assessment relative to 15 months, a term formed by interacting child's age and the treatment status indicator variable, and other explanatory variables from the HSFIS data.

TABLE D.5A *(continued)*

[a] The analysis sample for each outcome includes those with available outcome data at all three time points.

*Significantly different from zero at the .10 level, two-tailed test
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE D.5B

ESTIMATED IMPACTS PER ELIGIBLE APPLICANT ON KEY OUTCOMES AT 15, 25, AND 37 MONTHS USING THE POINT-IN-TIME AND GROWTH CURVE ESTIMATION METHODS

	Impact at 15 Months		Impact at 24 Months		Impact at 36 Months	
Variable	Point-In-Time Method	Growth Curve Method	Point-In-Time Method	Growth Curve Method	Point-In-Time Method	Growth Curve Method
Child Engagement (Semistructured Play)	.079	.092	.098*	.118***	.185***	.148**
Child Negativity Toward Parent (Semistructured Play)	-.110**	-.026	-.067	-.049	-.073**	-.076
Child Sustained Attention with Objects (Semistructured Play)	.095**	.080	.062	.108***	.138***	.142***
Parent Supportiveness (Semistructured Play)	.132***	.089*	.093*	.096**	.117***	.105*
Parent-Child Activities (HOME)	.010	.001	.079**	.028	.062	.060
Parent Detachment (Semistructured Play)	-.096**	-.091**	-.091**	-.064*	-.054*	-.033
Parent Intrusiveness (Semistructured Play)	-.061	-.065	-.044	-.053	-.040	-.038
Negativity Toward Parent (Semistructured Play)	-.029	.018	.008	.006	-.009	-.009
PSI: Parental Distress	-.481	-.831*	-1.049**	-.872**	-.670	-.922**
PSI: Parent-Child Dysfunctional Interaction	-.216	-.301	-.449*	-.266	.026	-.224
Family Conflict Scale (FES)	.006	.040	-.053**	.012	-.022	-.023
Sample Size[a]						
Parent Interview	**898**	**802**	**1,700**	**898**	**802**	**1,700**
Bayley	**559**	**485**	**1,044**	**559**	**485**	**1,044**
Video	**617**	**551**	**1,168**	**617**	**551**	**1,168**

SOURCE: Parent interview and child assessments.

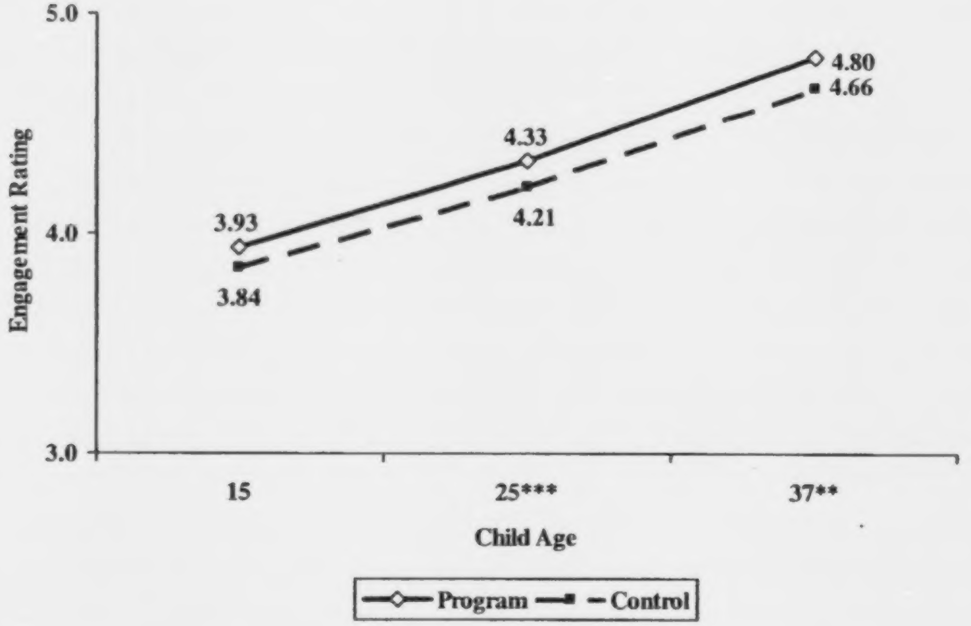
NOTE: All estimates were calculated using growth curve models. Generalized least squares techniques were used to estimate the regression models where the explanatory variables included a treatment status indicator variable, a variable signifying the age of the child at the interview or assessment relative to 15 months, a term formed by interacting child's age and the treatment status indicator variable, and other explanatory variables from the HSFIS data.

[a] The analysis sample for each outcome includes those with available outcome data at all three time points.

*Significantly different from zero at the .10 level, two-tailed test
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

FIGURE D.5A

GROWTH CURVES FOR CHILD ENGAGEMENT WITH PARENT IN SEMISTRUCTURED PLAY



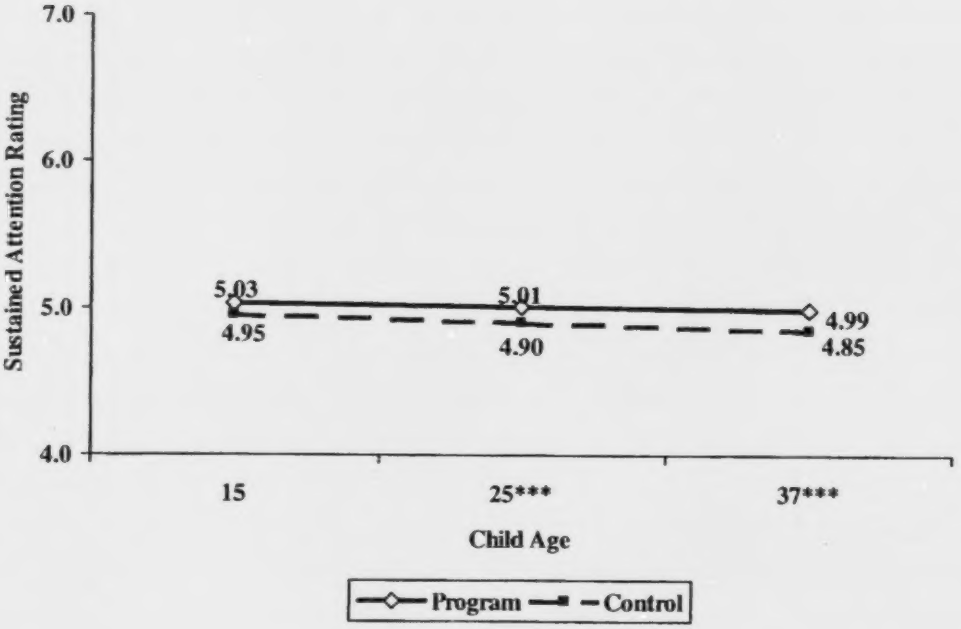
Source: Assessments of children's behavior during parent-child interactions in semistructured play conducted when children were approximately 15, 25, and 37 months old. The variable is coded on a scale of 1 to 7 (see Box V.2 and Appendix C).

Note: The growth curve analysis differs from the other impact analyses in several respects. The sample includes only those children and parents for whom we completed the assessments at all three ages. In addition, due to analytic complications, the growth curve analysis pooled the observations across sites rather than weighting by sites as was done for the point-in-time regression adjusted impact analyses. Appendix D.5 includes details on the sample sizes, estimated intercepts and slopes (growth rates) for each group, and the impacts on each. Hierarchical linear modeling produced the regression lines for the program and control groups. Asterisks indicate the significance of the difference between the regression lines at 15, 25, and 37 months:

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

FIGURE D.5B

GROWTH CURVES FOR CHILD SUSTAINED ATTENTION WITH OBJECTS IN SEMISTRUCTURED PLAY



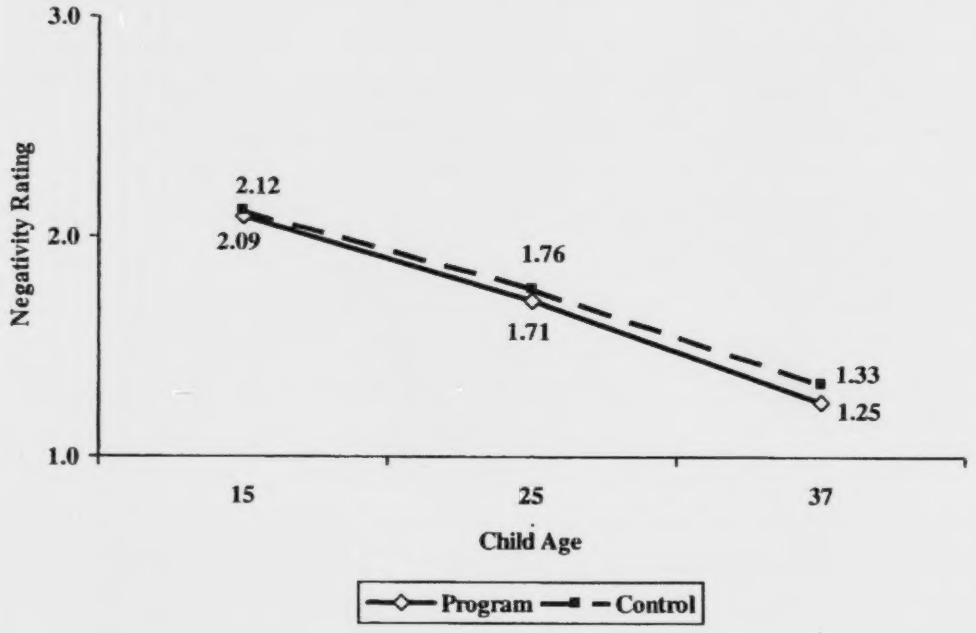
Source: Assessments of children's behavior during parent-child interactions in semistructured play conducted when children were approximately 15, 25, and 37 months old. The variable is coded on a scale of 1 to 7 (see Box V.3 and Appendix C).

Note: The growth curve analysis differs from the other impact analyses in several respects. The sample includes only those children and parents for whom we completed the assessments at all three ages. In addition, due to analytic complications, the growth curve analysis pooled the observations across sites rather than weighting by sites as was done for the point-in-time regression adjusted impact analyses. Appendix D.5 includes details on the sample sizes, estimated intercepts and slopes (growth rates) for each group, and the impacts on each. Hierarchical linear modeling produced the regression lines for the program and control groups. Asterisks indicate the significance of the difference between the regression lines at 15, 25, and 37 months:

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

FIGURE D.5C

GROWTH CURVES FOR CHILD NEGATIVITY TOWARD PARENT IN SEMISTRUCTURED PLAY

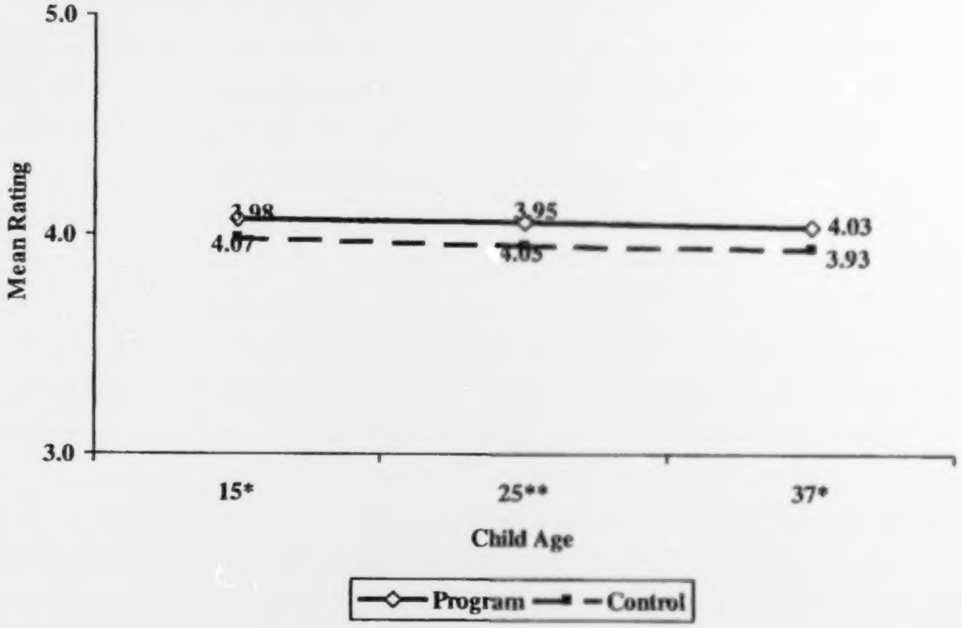


Source: Assessments of children's behavior during parent-child interactions in semistructured play conducted when children were approximately 15, 25, and 37 months old. The variable is coded on a scale of 1 to 7 (see Box V.2 and Appendix C).

Note: The growth curve analysis differs from the other impact analyses in several respects. The sample includes only those children and parents for whom we completed the assessments at all three ages. In addition, due to analytic complications, the growth curve analysis pooled the observations across sites rather than weighting by sites as was done for the point-in-time regression adjusted impact analyses. Appendix D.5 includes details on the sample sizes, estimated intercepts and slopes (growth rates) for each group, and the impacts on each. Hierarchical linear modeling produced the regression lines for the program and control groups. Asterisks indicate the significance of the difference between the regression lines at 15, 25, and 37 months.

FIGURE D.5D

PARENT SUPPORTIVENESS DURING SEMISTRUCTURED PLAY



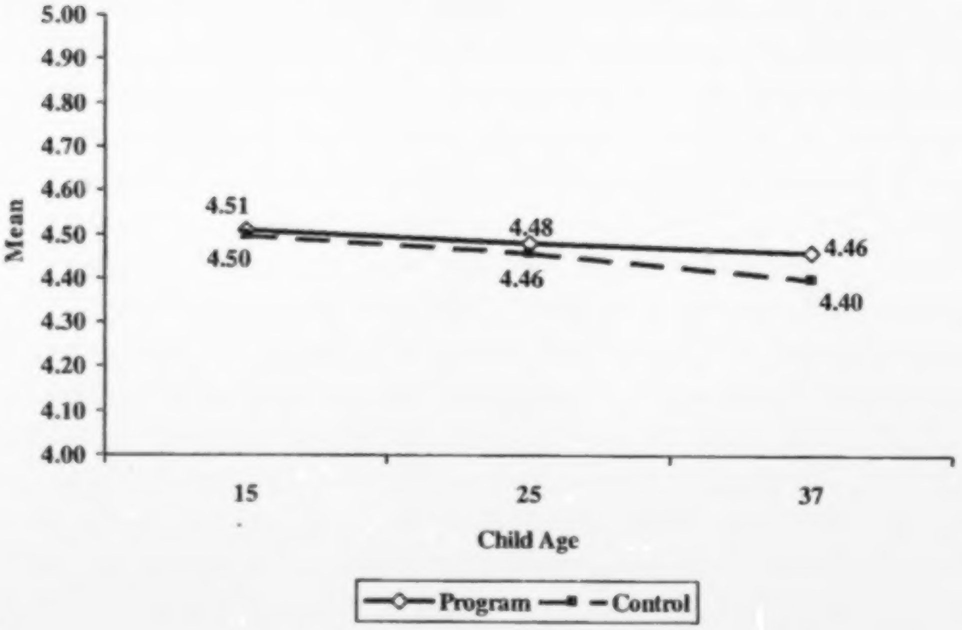
Source: Assessments of parents' behavior during parent-child interactions in semistructured play conducted when children were approximately 15, 25, and 37 months old. The variable is coded on a scale of 1 to 7 (see Box V.4 and Appendix C).

Note: The growth curve analysis differs from the other impact analyses in several respects. The sample includes only those children and parents for whom we completed the assessments at all three ages. In addition, due to analytic complications, the growth curve analysis pooled the observations across sites rather than weighting by sites as was done for the point-in-time regression adjusted impact analyses. Appendix D.5 includes details on the sample sizes, estimated intercepts and slopes (growth rates) for each group, and the impacts on each. Hierarchical linear modeling produced the regression lines for the program and control groups. Asterisks indicate the significance of the difference between the regression lines at 15, 25, and 37 months:

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

FIGURE D.5E

PARENT-CHILD PLAY ACTIVITIES

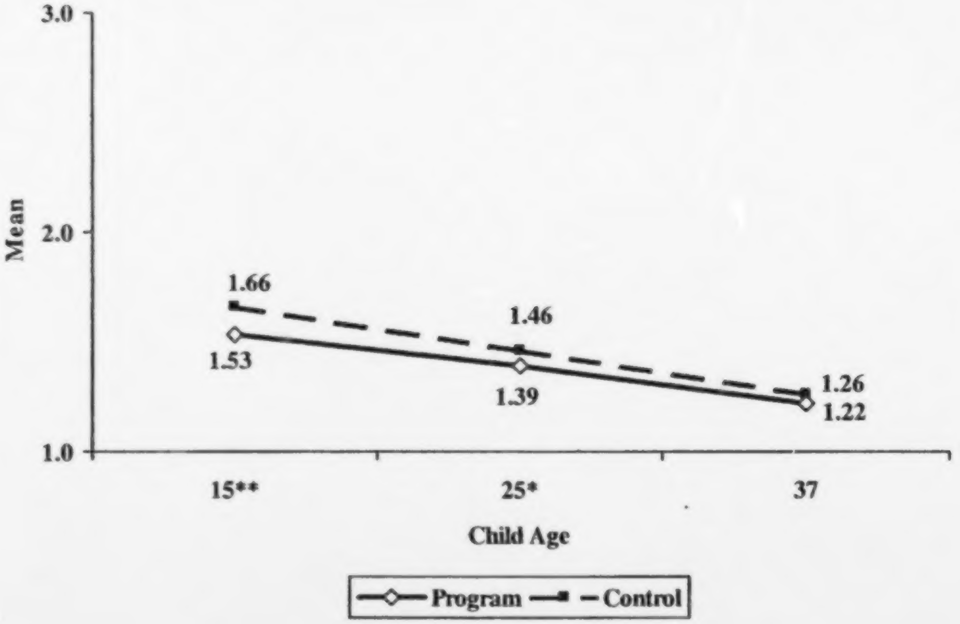


Source: Parent interviews conducted when children were approximately 15, 25, and 37 months old. Scores on the HOME parent-child activities scale can range from 1 to 6 (see Box V.5 and Appendix C).

Note: The growth curve analysis differs from the other impact analyses in several respects. The sample includes only those children and parents for whom we completed the assessments at all three ages. In addition, due to analytic complications, the growth curve analysis pooled the observations across sites rather than weighting by sites as was done for the point-in-time regression adjusted impact analyses. Appendix D.5 includes details on the sample sizes, estimated intercepts and slopes (growth rates) for each group, and the impacts on each. Hierarchical linear modeling produced the regression lines for the program and control groups. Asterisks indicate the significance of the difference between the regression lines at 15, 25, and 37 months.

FIGURE D.5F

PARENT DETACHMENT DURING SEMISTRUCTURED PLAY[a]



Source: Assessments of parent-child interactions in semistructured play conducted when children were approximately 15, 25, and 37 months old. The variable is coded on a scale of 1 to 7 (see Box V.6 and Appendix C).

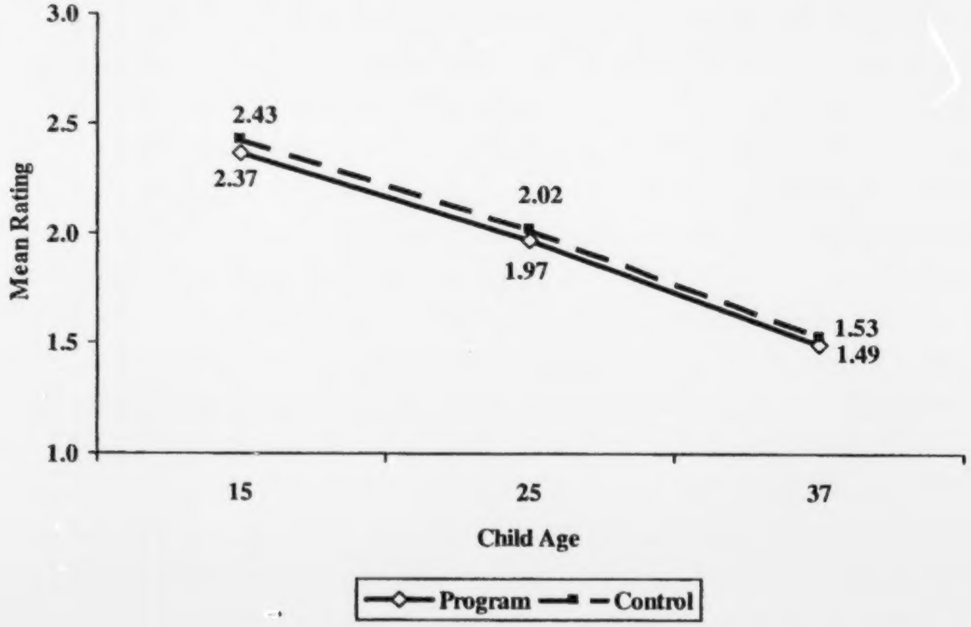
Note: The growth curve analysis differs from the other impact analyses in several respects. The sample includes only those children and parents for whom we completed the assessments at all three ages. In addition, due to analytic complications, the growth curve analysis pooled the observations across sites rather than weighting by sites as was done for the point-in-time regression adjusted impact analyses. Appendix D.5 includes details on the sample sizes, estimated intercepts and slopes (growth rates) for each group, and the impacts on each. Hierarchical linear modeling produced the regression lines for the program and control groups. Asterisks indicate the significance of the difference between the regression lines at 15, 25, and 37 months:

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

[a] Impact on the slope of the curves is statistically significant at $p<.05$, that is, the slope for the program group declines at a steeper rate than does the control group's.

FIGURE D.5G

PARENT INTRUSIVENESS DURING SEMISTRUCTURED PLAY



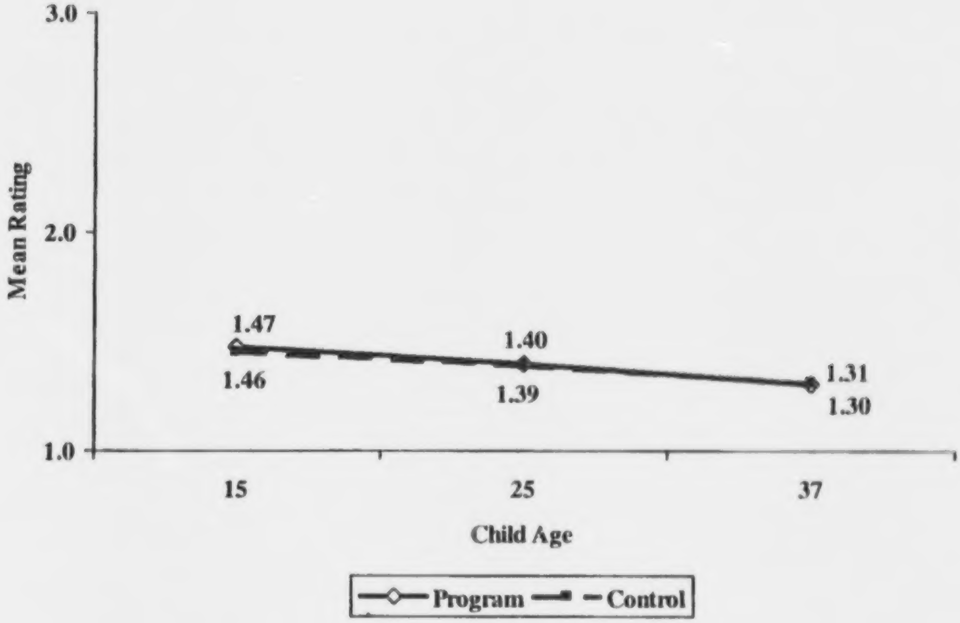
Source: Assessments of parents' behavior during parent-child interactions in semistructured play conducted when children were approximately 15, 25, and 37 months old. The variable is coded on a scale of 1 to 7 (see Box V.6 and Appendix C).

Note: The growth curve analysis differs from the other impact analyses in several respects. The sample includes only those children and parents for whom we completed the assessments at all three ages. In addition, due to analytic complications, the growth curve analysis pooled the observations across sites rather than weighting by sites as was done for the point-in-time regression adjusted impact analyses. Appendix D.5 includes details on the sample sizes, estimated intercepts and slopes (growth rates) for each group, and the impacts on each. Hierarchical linear modeling produced the regression lines for the program and control groups. Asterisks indicate the significance of the difference between the regression lines at 15, 25, and 37 months:

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

FIGURE D.5H

PARENT NEGATIVE REGARD DURING SEMISTRUCTURED PLAY

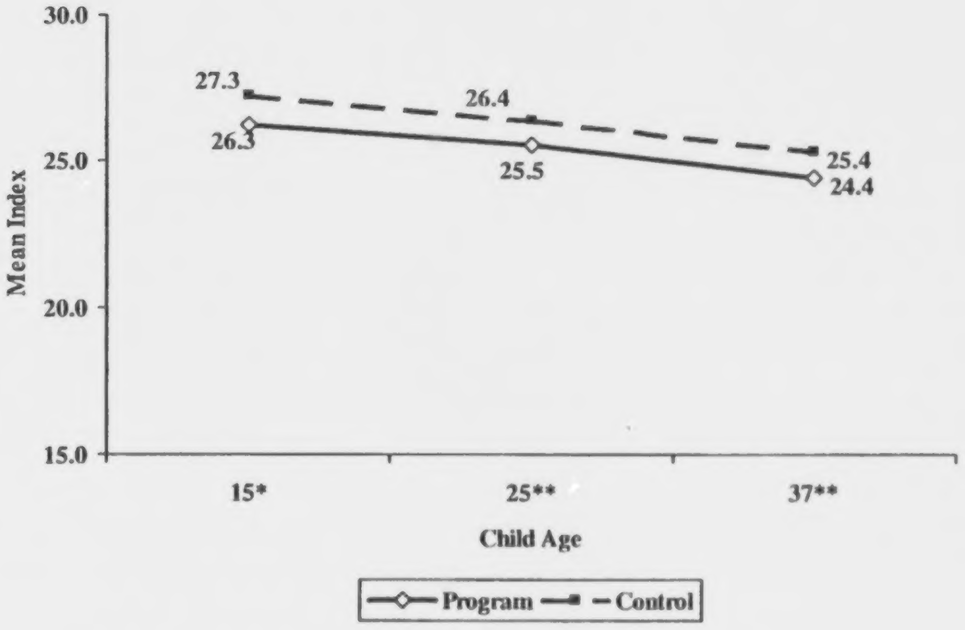


Source: Assessments of parents' behavior during parent-child interactions in semistructured play conducted when children were approximately 15, 25, and 37 months old. The variable is coded on a scale of 1 to 7 (see Box V.6 and Appendix C).

Note: The growth curve analysis differs from the other impact analyses in several respects. The sample includes only those children and parents for whom we completed the assessments at all three ages. In addition, due to analytic complications, the growth curve analysis pooled the observations across sites rather than weighting by sites as was done for the point-in-time regression adjusted impact analyses. Appendix D.5 includes details on the sample sizes, estimated intercepts and slopes (growth rates) for each group, and the impacts on each. Hierarchical linear modeling produced the regression lines for the program and control groups. Asterisks indicate the significance of the difference between the regression lines at 15, 25, and 37 months.

FIGURE D.51

PARENT DISTRESS (PSI)[a]



Source: Parent interview conducted when children were approximately 15, 25, and 37 months old. The 12-item scale yields scores that can range from 12 to 60 (see Box V.8 and Appendix C).

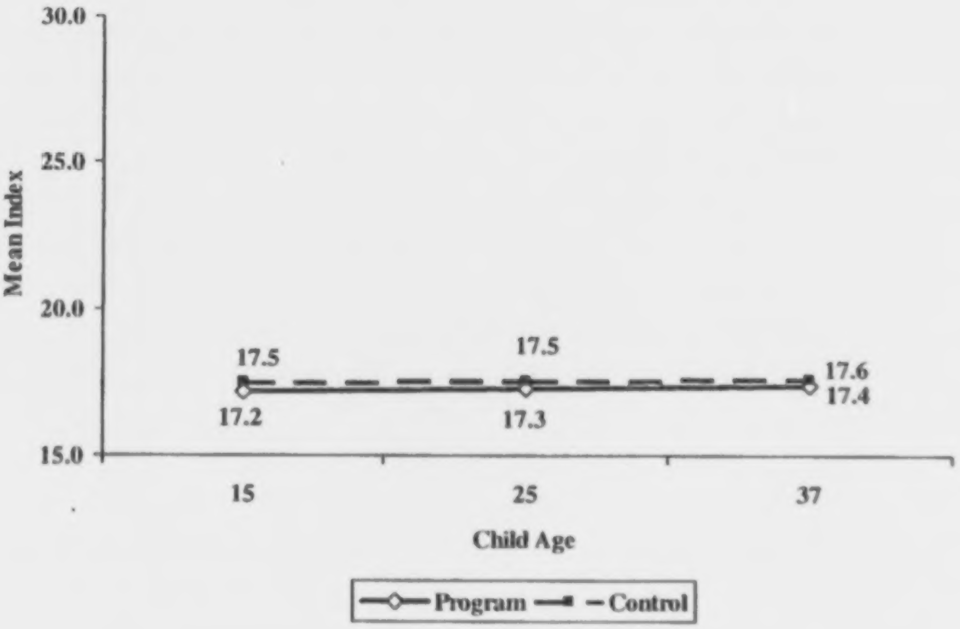
Note: The growth curve analysis differs from the other impact analyses in several respects. The sample includes only those children and parents for whom we completed the assessments at all three ages. In addition, due to analytic complications, the growth curve analysis pooled the observations across sites rather than weighting by sites as was done for the point-in-time regression adjusted impact analyses. Appendix D.5 includes details on the sample sizes, estimated intercepts and slopes (growth rates) for each group, and the impacts on each. Hierarchical linear modeling produced the regression lines for the program and control groups. Asterisks indicate the significance of the difference between the regression lines at 15, 25, and 37 months:

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

[a] Impact on the slope of the curves is statistically significant at $p<.10$, that is, the slope for the program group declines at a somewhat steeper rate than does the control group's.

FIGURE D.5J

PARENT-CHILD DYSFUNCTIONAL INTERACTION (PSI)

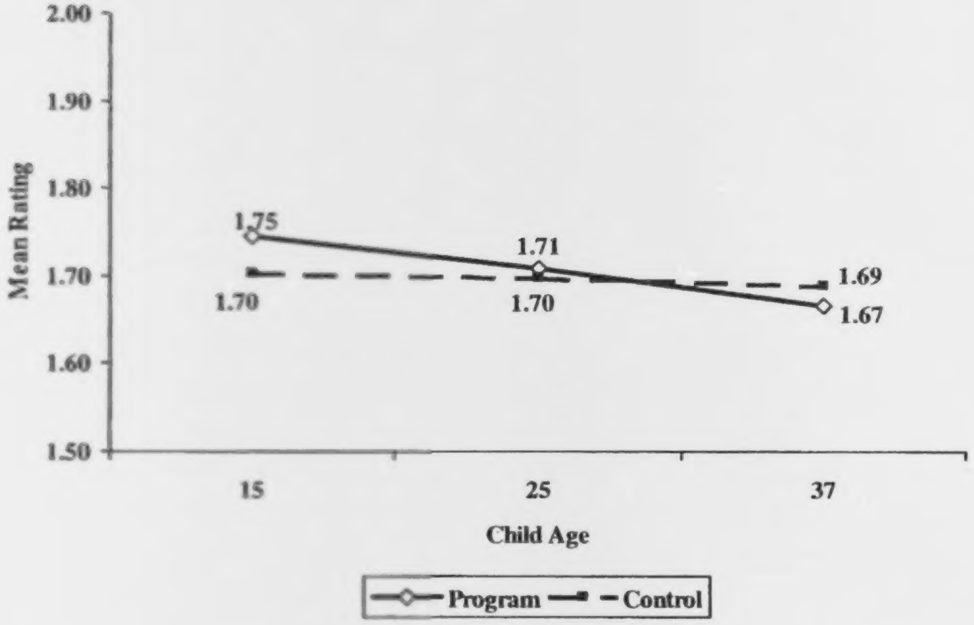


Source: Parent interview conducted when children were approximately 15, 25, and 37 months old. The 12-item scale yields scores that can range from 12 to 60 (see Box V.8 and Appendix C).

Note: The growth curve analysis differs from the other impact analyses in several respects. The sample includes only those children and parents for whom we completed the assessments at all three ages. In addition, due to analytic complications, the growth curve analysis pooled the observations across sites rather than weighting by sites as was done for the point-in-time regression adjusted impact analyses. Appendix D.5 includes details on the sample sizes, estimated intercepts and slopes (growth rates) for each group, and the impacts on each. Hierarchical linear modeling produced the regression lines for the program and control groups. Asterisks indicate the significance of the difference between the regression lines at 15, 25, and 37 months.

FIGURE D.5K

FAMILY CONFLICT (FAMILY ENVIRONMENT SCALE)[a]



Source: Parent interview conducted when children were approximately 15, 25, and 37 months old. The 5-item scale yields an average item score ranging from 1 to 4 (see Box V.8 and Appendix C).

Note: The growth curve analysis differs from the other impact analyses in several respects. The sample includes only those children and parents for whom we completed the assessments at all three ages. In addition, due to analytic complications, the growth curve analysis pooled the observations across sites rather than weighting by sites as was done for the point-in-time regression adjusted impact analyses. Appendix D.5 includes details on the sample sizes, estimated intercepts and slopes (growth rates) for each group, and the impacts on each. Hierarchical linear modeling produced the regression lines for the program and control groups. Asterisks indicate the significance of the difference between the regression lines at 15, 25, and 37 months.

[a] Impact on the slope of the curves is statistically significant at p<.10, that is, the slope for the program group declines at a somewhat steeper rate than does the control group's.

D.6 ESTIMATING IMPACTS PER ELIGIBLE APPLICANT

In the analyses reported in Volume I, we focus on impacts per applicant for the child and family outcomes, because these impact estimates are more policy relevant and differ very little from the impacts per eligible applicant. Because it is common in randomized clinical trials to base impact conclusions on all eligible applicants for the treatment, we wanted to determine whether impacts based on participants would differ from those based on our analysis of all eligible applicants. Tables D.6A through D.6N show the impacts per eligible applicant for key outcome variables, to illustrate how similar the impact findings are to those based on participants.

TABLE D.6A

IMPACTS ON COGNITIVE AND LANGUAGE DEVELOPMENT AT AGE 3

Outcome	Program Group	Control Group	Estimated Impact per Applicant[a]	Effect Size[b]
Bayley Mental Development Index (MDI)				
MDI Standard Score	91.3	89.9	1.4**	10.6
Percent with Bayley MDI Below 85	28.1	31.8	-3.7*	-8.0
Peabody Picture Vocabulary Test 3 (PPVT-III)				
PPVT-III Standard Score	82.8	81.0	1.8**	11.1
Percent with PPVT-III Below 85	51.9	57.1	-5.2**	-10.5
Sample Size				
Bayley	**879**	**779**	**1,658**	
PPVT	**738**	**665**	**1,403**	

SOURCE: Parent interview and child assessments conducted when children were approximately 36 months old.

NOTE: All impact estimates were calculated using regression models, where each site was weighted equally.

[a] The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for all program and control group members.

[b] The effect size was calculated by dividing the estimated impact per applicant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact expressed as a percentage of the standard deviation).

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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TABLE D.6B

IMPACTS ON POSITIVE SOCIAL-EMOTIONAL DEVELOPMENT AT AGE 3

Outcome	Program Group	Control Group	Estimated Impact per Applicant[a]	Effect Size[b]
Child Engagement of Parent During Play[c]	4.8	4.6	0.2***	17.7
Child Sustained Attention to Objects During Play[c]	5.0	4.8	0.1***	14.0
Child Engagement of Parent During Puzzle Challenge Task[d]	5.0	4.9	0.1*	8.3
Child Persistence During Puzzle Challenge Task[d]	4.6	4.5	0.1	5.7
Bayley Behavior Rating Scale (BRS): Emotional Regulation in a Cognitive Task (Average Score)[e]	4.0	4.0	0.0	0.5
BRS: Orientation/Engagement in a Cognitive Task (Average Score)[e]	3.9	3.8	0.0	3.4
Sample Size				
Parent-Child Interactions	**875**	**784**	**1,659**	
Bayley BRS	**936**	**833**	**1,769**	

SOURCE: Child assessments, interviewer observations, and assessments of semistructured parent-child interactions conducted when children were approximately 36 months old.

NOTE: All impact estimates were calculated using regression models, where each site was weighted equally.

[a] The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for all program and control group members.

[b] The effect size was calculated by dividing the estimated impact per applicant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact expressed as a percentage of the standard deviation).

[c] Behaviors were observed during the videotaped parent-child semistructured play task and coded on a seven-point scale.

[d] Behaviors were observed during the videotaped parent-child puzzle challenge task and coded on a seven-point scale.

[e] Behaviors were observed during the Bayley assessment and rated on a five-point scale by the interviewer/assessor.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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TABLE D.6C

IMPACTS ON NEGATIVE SOCIAL-EMOTIONAL DEVELOPMENT AT AGE 3

Outcome	Program Group	Control Group	Estimated Impact per Applicant[a]	Effect Size[b]
Child Negativity Toward Parent During Play[c]	1.2	1.3	-0.1**	-12.2
Child Frustration with Challenge Task[d]	2.7	2.7	0.0	2.9
ASEBA: Aggressive Behavior Scale (Average Score)	10.7	11.3	-0.6**	-8.7
Sample Size				
Parent Interview	**1,107**	**1,003**	**2,110**	
Parent-Child Interactions	**875**	**784**	**1,659**	

SOURCE: Parent interviews and assessments of semistructured parent-child interactions conducted when children were approximately 36 months old.

NOTE: All impact estimates were calculated using regression models, where each site was weighted equally.

[a] The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for all program and control group members.

[b] The effect size was calculated by dividing the estimated impact per applicant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact expressed as a percentage of the standard deviation).

[c] Behaviors were observed during the videotaped parent-child semistructured play task and coded on a seven-point scale.

[d] Behaviors were observed during the videotaped parent-child puzzle challenge task and coded on a seven-point scale.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE D.6D

IMPACTS ON EMOTIONALLY SUPPORTIVE PARENTING AT AGE 3

Outcome	Program Group	Control Group	Estimated Impact per Applicant[a]	Effect Size[b]
Home Observation for Measurement of the Environment (HOME): Warmth[c]	2.6	2.5	0.1*	8.2
Parent-Child Structured Play: Supportiveness[d]	4.0	3.9	0.1***	12.7
Parent-Child Puzzle Task: Supportive Presence[e]	4.5	4.4	0.1	4.4
Sample Size				
Parent Interview	**1,107**	**1,003**	**2,110**	
Parent-Child Interactions	**874**	**784**	**1,658**	

SOURCE: Parent interviews and assessments of semistructured parent-child interactions conducted when children were approximately 36 months old.

NOTE: All impact estimates were calculated using regression models, where each site was weighted equally.

[a] The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for all program and control group members.

[b] The effect size was calculated by dividing the estimated impact per applicant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact expressed as a percentage of the standard deviation).

[c] Behaviors were observed during the HOME assessment and rated on a yes/no scale by the interviewer/assessor.

[d] Behaviors were observed during the videotaped parent-child semi-structured play task and coded on a seven-point scale. Supportiveness is a combination of Warm Sensitivity and Positive Regard.

[e] Behaviors were observed during the videotaped parent-child puzzle challenge task and coded on a seven-point scale.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE D.6E

IMPACTS ON THE HOME ENVIRONMENT AND STIMULATION OF LANGUAGE AND LEARNING AT AGE 3

Outcome	Program Group	Control Group	Estimated Impact per Applicant[a]	Effect Size[b]
Home Observation for Measurement of the Environment (HOME) – Total Score	27.4	27.0	0.5**	9.9
Structuring the Child's Day				
Percentage of Parents Who Set a Regular Bedtime for Child	59.6	58.2	1.3	2.7
Percentage of Parents and Children Who Have Regular Bedtime Routines	69.3	68.6	0.8	1.7
Parent-Child Activities and Learning Support				
HOME: Support of Language and Learning	10.6	10.4	0.2**	8.8
Parent-Child Activities	4.4	4.3	0.1*	7.1
Parent-Child Puzzle Task: Quality of Assistance[c]	3.6	3.5	0.1*	8.4
Percentage of Parents Who Read to Child Every Day	56.5	52.2	4.3**	8.7
Percentage of Parents Who Regularly Read to Child at Bedtime	32.2	29.2	3.0	6.6
Internal Home Environment				
HOME: Internal Physical Environment	7.8	7.8	0.0	0.5
Sample Size				
Parent Interview	**1,107**	**1,003**	**2,110**	
Parent-Child Interactions	**874**	**784**	**1,658**	

SOURCE: Parent interviews, interviewer observations, and assessments of semistructured parent-child interactions conducted when children were approximately 36 months old.

NOTE: All impact estimates were calculated using regression models, where each site was weighted equally.

[a] The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for all program and control group members.

[b] The effect size was calculated by dividing the estimated impact per applicant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact expressed as a percentage of the standard deviation).

[c] Behaviors were observed during the videotaped parent-child puzzle challenge task and coded on a seven-point scale.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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TABLE D.6F

IMPACTS ON NEGATIVE PARENTING BEHAVIOR IN STRUCTURED PLAY AND INTERACTION AT AGE 3

Outcome	Program Group	Control Group	Estimated Impact per Applicant[a]	Effect Size[b]
Insensitivity				
Parent-Child Structured Play: Detachment[c]	1.2	1.3	-0.1*	-8.6
Parent-Child Structured Play: Intrusiveness[c]	1.6	1.6	-0.0	-5.2
Parent-Child Puzzle Task: Detachment[d]	1.6	1.6	-0.0	-0.5
Parent-Child Puzzle Task: Intrusiveness[d]	2.7	2.7	-0.1	-5.3
Hostility and Punishment				
Parent-Child Structured Play: Negative Regard[c]	1.3	1.3	-0.0	-1.5
Home Observation for Measurement of the Environment (HOME): Harshness[e]	0.3	0.3	0.0	1.5
Percentage of Parents Who Spanked the Child in the Previous Week	47.4	53.6	-6.3***	-12.6
Sample Size				
Parent Interview	1,107	1,003	2,110	
Parent-Child Interactions	874	784	1,658	

SOURCE: Parent interviews, interviewer observations, and assessments of semistructured parent-child interactions conducted when children were approximately 36 months old.

NOTE: All impact estimates were calculated using regression models, where each site was weighted equally.

[a] The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for all program and control group members.

[b] The effect size was calculated by dividing the estimated impact per applicant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact expressed as a percentage of the standard deviation).

[c] Behaviors were observed during the videotaped parent-child semi-structured play task and coded on a seven-point scale.

[d] Behaviors were observed during the videotaped parent-child puzzle challenge task and coded on a seven-point scale.

[e] Behaviors were observed during the HOME assessment and rated on a yes/no scale by the interviewer/assessor.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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TABLE D.6G

IMPACTS ON PARENTING KNOWLEDGE: SAFETY AND DISCIPLINE STRATEGIES AT AGE 3

Outcome	Program Group	Control Group	Estimated Impact per Applicant[a]	Effect Size[b]
Safety Practices				
Always Uses Car Seat for Child	70.3	70.7	-0.4	-0.8
Discipline Strategies				
Percentage of Parents Who Suggested Responses to Hypothetical Situations with Child:				
Prevent or distract	69.9	68.8	1.2	2.5
Remove child or object	80.8	81.2	-0.4	-1.2
Talk and explain	70.5	69.2	1.3	2.7
Time out	27.2	27.2	0.0	0.0
Threaten or command	10.5	13.4	-2.9**	-8.5
Shout	8.5	8.3	0.1	0.4
Physical punishment	46.9	51.2	-4.3**	-8.6
Percentage of Parents Suggesting Only Mild Responses to the Hypothetical Situations[c]	44.3	40.5	3.8*	7.8
Index of Severity of Discipline Strategies Suggested[d]	3.4	3.5	-0.2***	-10.0
Sample Size	**1,107**	**1,003**	**2,110**	

SOURCE: Parent interviews conducted when children were approximately 36 months old.

NOTE: All impact estimates were calculated using regression models, where each site was weighted equally.

[a] The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for all program and control group members.

[b] The effect size was calculated by dividing the estimated impact per applicant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact expressed as a percentage of the standard deviation).

[c] Parents were classified as suggesting only mild discipline if their responses to the three discipline situations include only the following: prevent or distract, remove child or object, talk and explain, time out, restrain child, ignore child, warn or remind, or bribe child.

[d] The Index of Severity of Discipline Strategies is based on a hierarchy of discipline practices, from talk and explain, remove child or object, time out, or prevent/distract (1) through physical punishment (5). The most severe approach suggested is used to code this scale.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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TABLE D.6H

IMPACTS ON PARENT HEALTH, MENTAL HEALTH, AND FAMILY FUNCTIONING AT AGE 3

Outcome	Program Group	Control Group	Estimated Impact per Applicant[a]	Effect Size[b]
Parent's Physical Health				
Parent's Health Status	3.4	3.5	-0.0	-4.2
Parent's Mental Health				
Parental Distress	24.8	25.5	-0.7	-7.1
Parent-Child Dysfunctional Interaction	17.8	17.7	0.0	0.4
CES-Depression Scale (CES-D; short form)	7.4	7.7	-0.3	-3.6
CES-D: Severe Depressive Symptoms	14.3	14.9	-0.6	-1.6
Family Functioning				
Family Environment Scale–Family Conflict (Average Score)	1.7	1.7	-0.0	-4.3
Sample Size	**1,107**	**1,003**	**2,110**	

SOURCE: Parent interviews conducted when children were approximately 36 months old.

NOTE: All impact estimates were calculated using regression models, where each site was weighted equally.

[a] The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for all program and control group members.

[b] The effect size was calculated by dividing the estimated impact per applicant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact expressed as a percentage of the standard deviation).

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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TABLE D.6I

IMPACTS ON SELF-SUFFICIENCY ACTIVITIES 28 MONTHS AFTER RANDOM ASSIGNMENT

Outcome	Program Group	Control Group	Estimated Impact per Applicant[a]	Effect Size[b]
Any Self-Sufficiency Activities				
Percentage of Parents Ever Employed or in an Education or Job Training Program in First 26 Months	93.3	90.2	3.1**	10.2
Average Hours per Week Employed at All Jobs and in Any Education or Training in First 26 Months	22.0	20.6	1.4**	8.7
Employment Activities				
Percentage of Parents Ever Employed in First 26 Months	86.1	83.1	3.0*	8.1
Average Hours per Week Employed at All Jobs in First 26 Months	16.9	16.8	0.1	0.9
Education Activities				
Percentage of Parents Who Ever Participated in an Education or Training Program in First 26 Months	59.3	51.5	7.8***	15.6
Average Hours per Week in an Education Program During First 26 Months	4.5	3.4	1.1***	16.7
Sample Size	**1,139**	**1,097**	**2,236**	

SOURCE: Parent services follow-up interviews conducted an average of 7, 16, and 28 months after random assignment.

NOTE: All impact estimates were calculated using regression models, where each site was weighted equally.

[a] The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for all program and control group members.

[b] The effect size was calculated by dividing the estimated impact per applicant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact expressed as a percentage of the standard deviation).

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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TABLE D.6J

IMPACTS ON EDUCATION ACTIVITIES AND CREDENTIALS 28 MONTHS AFTER RANDOM ASSIGNMENT

Outcome	Program Group	Control Group	Estimated Impact per Applicant[a]	Effect Size[b]
Types of Education Activities				
High School	13.5	9.4	4.1***	14.3
High School or Alternative	14.3	10.8	3.5***	11.6
Adult Basic Education	4.4	3.7	0.8	4.2
English as a Second Language	3.3	2.4	0.9	6.5
GED Preparation	10.1	8.8	1.2	4.4
Any Vocational Education	19.7	17.3	2.4	6.5
Two-Year College	10.9	10.2	0.7	2.4
Four-Year College	5.9	5.7	0.3	1.1
Degrees and Credentials Received				
Highest Grade Completed at Second Followup	11.6	11.6	-0.1	-3.0
GED Certificate	10.6	11.5	-1.0	-3.0
High School Diploma	49.2	48.4	0.8	1.6
Vocational, Business, or Secretarial Diploma	16.9	16.9	0.0	0.1
Associate's Degree	3.5	4.5	-1.0	-5.1
Bachelor's Degree	4.6	5.4	-1.4	-6.3
Sample Size	**1,139**	**1,097**	**2,236**	

SOURCE: Parent services follow-up interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All impact estimates were calculated using regression models, where each site was weighted equally.

[a] The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for all program and control group members.

[b] The effect size was calculated by dividing the estimated impact per applicant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact expressed as a percentage of the standard deviation).

*Significantly different from zero at the .10 level, two-tailed test
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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TABLE D.6K

IMPACTS ON WELFARE PROGRAM PARTICIPATION 28 MONTHS AFTER RANDOM ASSIGNMENT

Outcome	Program Group	Control Group	Estimated Impact per Applicant[a]	Effect Size[b]
Welfare Program Participation				
Percentage of Parents Who Received Any Welfare Benefits During First 26 Months	68.4	66.8	1.6	3.4
Total Welfare Benefits Received During First 26 Months	$5,411	$5,607	-$196	-2.6
Percentage of Parents Who Received AFDC or TANF Benefits During First 26 Months	47.1	45.1	2.0	4.0
Total AFDC or TANF Benefits Received During First 26 Months	$2,171	$2,196	-$25	-0.6
Average Total Food Stamp Benefits Received During First 26 Months	$2,141	$2,099	$42	1.5
Sample Size	**1,139**	**1,097**	**2,236**	

SOURCE: Parent services follow-up interviews conducted an average of 7, 16, and 28 months after random assignment.

NOTE: All impact estimates were calculated using regression models, where each site was weighted equally.

[a] The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for all program and control group members.

[b] The effect size was calculated by dividing the estimated impact per applicant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact expressed as a percentage of the standard deviation).

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

AFDC = Aid to Families with Dependent Children; TANF = Temporary Assistance for Needy Families.

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TABLE D.6L

IMPACTS ON FAMILY INCOME AND RESOURCES 28 MONTHS AFTER RANDOM ASSIGNMENT

Outcome	Program Group	Control Group	Estimated Impact Per Applicant[a]	Effect Size[d]
Percentage of Families with Income Above the Poverty Line at Third Followup	41.7	42.5	-0.7	-1.5
Total Family Resources Scale				
First Followup	149.6	148.5	1.0	4.9
Second Followup	152.8	151.5	1.3	6.8
Third Followup	154.5	153.5	1.0	5.0
Sample Size	**1,139**	**1,097**	**2,236**	

SOURCE: Parent services follow-up interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All impact estimates were calculated using regression models, where each site was weighted equally.

[a] The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for all program and control group members.

[b] The effect size was calculated by dividing the estimated impact per applicant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact expressed as a percentage of the standard deviation).

*Significantly different from zero at the .10 level, two-tailed test

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

TABLE D.6M

IMPACTS ON CHILD AND FAMILY OUTCOMES AT AGE 3 OR 28 MONTHS AFTER RANDOM ASSIGNMENT, BY PROGRAM APPROACH IN FALL 1997

	Center-Based Programs				Home-Based Programs				Mixed Approach Programs			
Outcome	Program Group	Control Group	Impact Estimate Per Applicant[a]	Effect Size[b]	Program Group	Control Group	Impact Estimate Per Applicant[a]	Effect Size[b]	Program Group	Control Group	Impact Estimate Per Applicant[a]	Effect Size[b]
Child Cognitive and Language Development												
Average Bayley Mental Development Index (MDI)	88.8	88.1	0.6	4.8	93.9	92.7	1.1	8.6	89.7	88.3	1.4	10.6
Percentage with MDI < 85***	32.7	39.4	-6.8	-14.5	21.2	22.3	-1.2	-2.5	34.2	36.5	-2.3	-5.0
PPVT-III Standard Score	81.5	80.6	0.9	5.7	84.2	82.9	1.2	7.6	82.6	79.2	3.5**	21.2
Percentage with PPVT-III<85***	57.3	58.4	-1.1	-2.3	45.8	48.4	-2.5	-5.1	53.8	64.9	-11.1**	-22.3
Child Social-Emotional Development												
Child Behavior Checklist—Aggressive	10.0	10.8	-0.8	-12.1	11.2	11.7	-0.5	-7.1	10.7	11.2	-0.5	-8.5
Parent-Child Structured Play: Child Sustained Attention with Objects (Average)*	4.9	4.9	-0.0	-1.1	5.0	4.9	0.1	9.8	5.0	4.7	0.3***	28.7
Parent-Child Structured Play: Child Negativity Toward Parent (Average)	1.2	1.4	-0.1**	-21.9	1.3	1.3	-0.0	-6.2	1.3	1.3	-0.1	-14.4
Parent-Child Structured Play: Child Engagement (Average)	4.8	4.7	0.1	9.4	4.8	4.6	0.2**	18.5	4.8	4.5	0.3***	27.8
Puzzle Challenge Task: Child Engagement (Average)	5.0	4.9	0.1	5.6	5.1	5.0	0.1	6.0	5.0	4.9	0.1	13.3
Puzzle Challenge Task: Persistence	4.4	4.4	0.1	5.4	4.7	4.6	0.1	11.8	4.5	4.5	0.0	3.3
Puzzle Challenge Task: Frustration	2.5	2.7	-0.2	-12.6	2.7	2.6	0.1	6.3	2.8	2.7	0.1	9.8
Parenting												
Home Observation for Measurement of the Environment (HOME) Total Score	26.8	26.1	0.8*	16.2	28.2	28.1	0.2	3.1	26.9	26.4	0.5	10.8
Parent-Child Structured Play: Parent Supportiveness	4.0	4.0	0.0	3.3	4.0	3.9	0.1**	14.5	4.0	3.8	0.2**	19.7
Puzzle Challenge Task: Parent Supportive Presence	4.4	4.5	-0.1	-4.8	4.6	4.5	0.1	7.4	3.7	3.4	0.3**	23.7
Puzzle Challenge Task: Quality of Assistance	3.5	3.5	0.0	1.7	3.6	3.5	0.0	2.0	2.7	2.9	-0.1	-10.5
Parent Reads to Child Daily***	34.5	49.1	5.4	10.7	54.0	55.0	-1.0	-1.9	62.6	49.5	13.1***	26.2
Parent-Child Structured Play: Parent Detachment**	1.2	1.2	0.1	14.9	1.2	1.3	-0.1	-8.9	1.2	1.3	-0.1**	-22.8
Puzzle Challenge Task: Parent Detachment	1.6	1.6	0.0	3.3	1.6	1.6	-0.0	-3.4	1.6	1.8	-0.2	-15.8
Spanked Child Last Week***	51.7	59.3	-7.6	-15.2	44.5	49.7	-5.2	-10.5	45.9	56.2	-10.3**	-20.6
Parenting Stress Index (PSI) Parental Distress	24.0	24.7	-0.7	-7.8	25.0	26.2	-1.3**	-13.3	24.6	25.6	-1.0	-10.8

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Table D.6M (*Continued*)

	Center-Based Programs				Home-Based Programs				Mixed Approach Programs			
Outcome	Program Group	Control Group	Impact Estimate Per Applicant[a]	Effect Size[b]	Program Group	Control Group	Impact Estimate Per Applicant[a]	Effect Size[b]	Program Group	Control Group	Impact Estimate Per Applicant[a]	Effect Size[b]
Self-Sufficiency												
Ever in Education or Training**	63.2	60.7	2.5	5.0	64.5	51.8	12.7***	25.4	52.7	45.6	7.1**	14.3
Average Hours per Week in Education or Training	5.1	4.7	0.4	6.1	4.1	3.2	0.8*	13.1	4.4	3.0	1.4***	22.1
Ever Employed***	90.9	87.9	3.1	8.2	87.9	81.9	6.0**	15.9	82.3	81.0	1.3	3.5
Average Hours/Week Employed	21.3	20.7	0.6	3.9	16.9	15.9	1.1	7.2	14.7	15.0	-0.2	-1.7
Subsequent Birth by 24 Months after Random Assignment***	15.7	20.1	-4.4	-9.8	24.8	30.4	-5.6	-12.5	26.6	28.4	-1.8	-4.1
Sample Size												
Parent Interview	**254**	**216**	**470**		**350**	**343**	**693**		**502**	**448**	**950**	
Parent-Child Interactions	**228**	**181**	**409**		**252**	**255**	**507**		**396**	**348**	**744**	

SOURCE: Parent interview and child assessments conducted when children were approximately 36 months old. Self-sufficiency information from parent service interviews completed an average of 28 months after random assignment.

NOTE: All impact estimates were calculated using regression models, where each site was weighted equally.

[a] The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for all program and control group members.

[b] The effect size was calculated by dividing the estimated impact per applicant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact expressed as a percentage of the standard deviation).

*Significantly different from zero at the .10 level, two-tailed [or one-tailed] test.
**Significantly different from zero at the .05 level, two-tailed [or one-tailed] test.
***Significantly different from zero at the .01 level, two-tailed [or one-tailed] test.

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TABLE D.6N

IMPACTS ON CHILD AND FAMILY OUTCOMES AT AGE 3 OR 28 MONTHS AFTER RANDOM ASSIGNMENT, BY PATTERN OF IMPLEMENTATION

	Early Implementers				Late Implementers				Incomplete Implementers			
Outcome	Program Group	Control Group	Impact Estimate Per Applicant[a]	Effect Size[b]	Program Group	Control Group	Impact Estimate Per Applicant[a]	Effect Size[b]	Program Group	Control Group	Impact Estimate Per Applicant[a]	Effect Size[b]
Child Cognitive and Language Development												
Average Bayley Mental Development Index (MDI)	94.1	92.0	2.1*	16.1	88.0	86.1	1.9**	14.8	91.8	92.0	-0.3	-2.0
Percentage with MDI < 85***	21.3	26.6	-5.3	-11.4	37.0	42.7	-5.7	-12.3	25.4	25.8	-0.4	-0.8
PPVT-III Standard Score	86.0	84.7	1.2	7.6	77.8	75.0	2.7*	16.8	83.9	82.8	1.1	6.9
Percentage with PPVT-III < 5***	42.2	49.4	-7.2	-14.5	65.7	70.7	-4.9	-9.9	49.2	53.1	-3.9	-7.8
Child Social-Emotional Development												
Child Behavior Checklist—Aggressive	10.9	11.6	-0.7	-10.7	10.9	11.1	-0.1	-2.2	10.1	11.5	-1.4**	-21.7
Parent-Child Structured Play: Child Sustained Attention with Objects (Average)	5.1	5.0	0.1	13.1	4.8	4.7	0.1	11.5	5.0	4.8	0.2**	19.3
Parent-Child Structured Play: Child Negativity Toward Parent (Average)	1.2	1.3	-0.1**	-17.0	1.3	1.3	-0.1	-7.8	1.3	1.3	-0.1	-8.1
Parent-Child Structured Play: Child Engagement (Average)	4.9	4.8	0.1	10.2	4.7	4.5	0.2**	20.0	4.8	4.5	0.3***	30.8
Puzzle Challenge Task: Child Engagement (Average)	5.1	5.0	0.1	6.5	4.9	4.9	0.1	5.3	5.1	5.0	0.2	15.1
Puzzle Challenge Task: Persistence	4.7	4.7	-0.0	-2.2	4.4	4.4	0.1	6.7	4.6	4.4	0.2*	18.3
Puzzle Challenge Task: Frustration	2.9	2.9	-0.0	-2.1	2.6	2.5	0.2	13.2	2.6	2.6	0.0	2.3
Parenting												
Home Observation for Measurement of the Environment (HOME) Total Score	28.1	27.2	0.9**	19.0	26.2	26.0	0.2	3.8	28.1	27.7	0.4	7.5
Parent-Child Structured Play: Parent Supportiveness	4.1	4.1	0.0	4.3	3.8	3.6	0.2**	18.4	4.0	3.8	0.2*	18.7
Puzzle Challenge Task: Parent Supportive Presence	4.9	4.8	0.1	10.1	4.1	4.1	0.0	1.1	4.4	4.4	0.0	3.3
Puzzle Challenge Task: Quality of Assistance	3.9	3.9	0.1	4.0	3.4	3.2	0.2***	18.8	3.4	3.4	0.0	1.4
Parent Reads to Child Daily***	65.5	54.7	10.8***	21.6	48.3	43.0	5.3	10.5	57.5	58.7	-1.1	-2.2
Parent-Child Structured Play: Parent Detachment	1.2	1.2	0.0	2.0	1.2	1.3	-0.1**	-17.2	1.2	1.3	-0.1	-9.8
Puzzle Challenge Task: Parent Detachment	1.6	1.6	-0.0	-2.8	1.7	1.7	-0.0	-3.4	1.6	1.7	-0.0	-3.7
Spanked Child Last Week***	43.6	51.5	-7.8*	-15.7	48.1	55.9	-7.8**	-15.7	49.3	55.0	-5.7	-11.3
Parenting Stress Index (PSI) Parental Distress	24.2	24.9	-0.7	-7.3	26.0	26.6	-0.6	-6.1	23.8	25.1	-1.3	-13.7

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Table D.6N (*Continued*)

	Early Implementers				Late Implementers				Incomplete Implementers			
Outcome	Program Group	Control Group	Impact Estimate Per Applicant[a]	Effect Size[b]	Program Group	Control Group	Impact Estimate Per Applicant[a]	Effect Size[b]	Program Group	Control Group	Impact Estimate Per Applicant[a]	Effect Size[b]
Self-Sufficiency												
Ever in Education or Training**	59.4	52.5	6.9*	13.9	54.3	49.8	4.5	9.1	63.8	53.4	10.4***	20.8
Average Hours per Week in Education or Training	3.3	3.0	0.2	3.8	4.2	3.2	1.1**	16.5	6.1	4.4	1.7***	27.3
Ever Employed***	90.1	84.7	5.4**	14.3	82.2	82.5	-0.3	-0.7	86.5	81.4	5.1	13.6
Average Hours/Week Employed	18.3	16.8	1.5	10.2	16.2	17.0	-0.8	-5.5	16.4	16.2	0.1	0.8
Subsequent Birth by 24 Months after Random Assignment***	22.9	29.0	-6.1	-13.6	25.6	26.1	-0.5	-1.2	20.4	27.0	-6.5	-14.5
Sample Size												
Parent Interview	**254**	**216**	**470**		**350**	**343**	**693**		**502**	**448**	**950**	
Parent-Child Interactions	**228**	**181**	**409**		**252**	**255**	**507**		**396**	**348**	**744**	

SOURCE: Parent interview and child assessments conducted when children were approximately 36 months old. Self-sufficiency information from parent service interviews completed an average of 28 months after random assignment.

NOTE: All impact estimates were calculated using regression models, where each site was weighted equally.

[a] The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for all program and control group members.

[b] The effect size was calculated by dividing the estimated impact per applicant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact expressed as a percentage of the standard deviation).

*Significantly different from zero at the .10 level, two-tailed [or one-tailed] test.
**Significantly different from zero at the .05 level, two-tailed [or one-tailed] test.
***Significantly different from zero at the .01 level, two-tailed [or one-tailed] test.

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D.7 RESULTS FROM THE SERVICE INTENSITY ANALYSIS

Families in the program group received different amounts of Early Head Start services. The amount and nature of services that a particular family received was determined in part by family members themselves (because Early Head Start is a voluntary program), as well as by the amount and nature of services they were offered. Thus, the level of services received by families differed both within programs and across programs.

An important policy issue is the extent to which impacts on key outcomes varied for families who received different levels of service intensity. In Chapter III of Volume I, we identified family and site characteristics that are associated with high levels of service receipt. We then used this information to examine whether estimated impacts on key outcomes were larger for subgroups of families who received intensive services than for subgroups of families who received less intensive services. This approach only indirectly assesses whether service intensity matters, because there may be other factors besides differences in service intensity that can account for differences in impacts across subgroups.

This appendix describes our analysis to more directly assess the extent to which service intensity matters. First, we present our methodological approach, and second, the analysis findings.

1. Methodological Approach

As discussed in Chapter II, the estimation of dosage effects is complicated by the potential presence of *unobservable* differences between families who received different amounts of services that are correlated with child and family outcomes. If uncorrected, this "sample selection" problem can lead to seriously biased estimates of dosage effects. This section discusses our approach for adjusting for this potential selection problem.

a. Propensity Scoring

We used "propensity scoring" (Rosenbaum and Rubin 1985) as our primary approach, to try to account for sample selection bias when estimating dosage effects. In our context, this procedure identified control group members who would have been likely to receive intensive services and those who would not have been likely to receive intensive services if they had instead been assigned to the program group. Impacts for the high-service intensity group were then estimated by comparing the outcomes of program and control group families in the high-service intensity group, and similarly for the low-service intensity group. We then compared these two sets of impact estimates.

We used two versions of the propensity scoring approach: (1) the "*matching method*" and (2) the "*cutoff method*."

The Matching Method. This method was implemented as follows:

- ***Using the program group only, we estimated logit regression models predicting whether a family received intensive services.*** For analytic simplicity and sample size considerations, we conducted the analysis by classifying program group families into two groups: a high-service intensity group and a low-service intensity group (including those who received no services). We then estimated a logit model where the probability a program group family received intensive services was regressed on child and family characteristics measured at baseline and site indicator variables. The explanatory variables used in these logit models were posited to be associated with service intensity and with the child and family outcome measures, and were the same ones as those used in the regression models for the basic impact analysis (see Table II.6 in the main report).[9]
- ***Predicted probabilities (propensity scores) were calculated for each program and control group member.*** The propensity scores were constructed using the parameter estimates from the logit models and the sample members' explanatory variable values. The propensity scores are a function (weighted average) of the observable characteristics of the families.

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[9] We did not estimate separate logit models by site because of small sample sizes.

- ***Using the propensity scores, we matched a control group family to each program group family.*** A control group family was selected as a match for a program group family if, among all controls, it had the closest propensity score value to that of the program group family. *Matching* was performed with *replacement*, so that a control group family could be a match for multiple program group families.[10]
- ***Dosage effects were then estimated by comparing the outcomes of program group members to their matched controls for each service intensity group.*** Impacts for those who received intensive services were estimated by comparing the average outcomes of program group members who received intensive services to the average outcomes of their *matched* controls. Similarly, impacts for those in the low-service intensity group were estimated by comparing the average outcomes of program group families who did not receive intensive services with their matched controls.

This propensity scoring procedure uses a flexible functional form to match control group members to program group members, based on their observable characteristics (that is, it adjusts for selection on observable variables). The procedure assumes that if the distributions of observable characteristics are similar for program group families and their matched controls in each service intensity group, then the distributions of *unobservable* characteristics for program and control group families should also be similar in each service intensity group. Under this (untestable) assumption, the procedure yields unbiased estimates of dosage effects.[11]

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[10] As discussed below, we conducted statistical tests to assess the adequacy of the matching process. If these statistical tests failed, we re-estimated the logit regression models by including interaction terms as additional explanatory variables in the models (see Dehejia and Wahba 1999; Rubin 2001).

[11] There are also cross-sectional statistical methods (such as instrumental variable estimation techniques) that directly account for sample selection bias due to *unobservable* variables (Heckman and Robb 1985). These methods, however, rely on finding (instrumental) variables that are correlated with service intensity but are uncorrelated with unobservable factors associated with the child and family outcomes. Given our available data, we have not been able to identify credible instrumental variables, and thus, do not employ these methods. However, as discussed later in this section, we use *longitudinal* "fixed-effects" methods which do account for selection bias due to unobservable factors.

The Cutoff Method. We also estimated dosage effects using a variant of the matching method, which we refer to as the *cutoff method*. The cutoff method is based on the fact that, because of random assignment, the expected percentage of control group members who would have received intensive services if they had instead been assigned to the program group should be *equal* to the percentage of program group members who actually received intensive services (which, as described below, is about 33 percent using the self-reported measure from the PSI data). Similarly, we expect that 67 percent of control group families would have received less-intensive services. Thus, we can divide both the program and control groups into those with the largest propensity scores (the high-service intensity group) and those with lowest propensity scores (the low-service intensity group), and estimate impacts for each group.

Specifically, the cutoff method was implemented as follows:

- ***The high-service intensity group was created by selecting program and control group members with large propensity scores, and the low-service intensity group was created by selecting those with smaller propensity scores.*** The high-service intensity group included the 33 percent of program group members with the largest propensity scores among all program group members, and the 33 percent of control group members with the largest propensity scores among all controls. Similarly, the low-service intensity group included the remaining 67 percent of sample members with smaller propensity scores.

- ***Dosage effects were then estimated by comparing the average outcomes of program and control group members within each service intensity group.*** Impacts for those who received intensive services were obtained by comparing the average outcomes of program and control group members in the high-service intensity group. Similarly, impacts for those who received fewer services were obtained by comparing the average outcomes of program and control group families in the low-service intensity group.

Importantly, the matching and cutoff methods should produce similar results if the propensity scores are capturing important differences between high- and low-service intensity families that are correlated with the outcome measures. Thus, as discussed in the next section, we examined the similarity of the impact results using the two methods to test the reliability of the propensity scoring approach.

Interpretation of the Impact Estimates. A subtle, but important, point concerns the interpretation of the impact estimates using the matching and cutoff methods. The estimated impacts for the high service-intensity group tell us about the effects of Early Head Start for those families who *chose to receive or had access to* a significant amount of services. Similarly, the estimated impacts for the low service-intensity group tell us about program effects for those families who chose to receive or had access to smaller amounts of services. The two types of families are very different. Thus, the impact findings *do not* tell us about how those families in the low service intensity group would have fared if they had received more services. Nor do the impact estimates tell us about the extent to which the outcomes of an average family would have improved if that family received additional services. Instead, the findings shed light on the effectiveness of Early Head Start for those who opt to receive significant amounts of services and for those who opt to receive fewer services. We believe that these are the policy-relevant questions, because Early Head Start is a voluntary program and not a mandatory one; thus, families cannot be forced to receive a minimum amount of services.

Goodness-of-Fit Tests. The propensity scoring approach uses the predicted probabilities from the logit models to classify sample members into high- or low-service intensity groups. A fundamental question, however, is: Are families classified correctly? Clearly, we can only obtain credible impact estimates for the two service intensity groups if families are partitioned correctly into the two groups (and in particular, for control group families whose service intensity measures are not observed).

We use three categories of statistical goodness-of-fit tests to assess the success of the propensity scoring procedure: (1) those based on the parameter estimates from the logit models;

(2) those based on the quality of the matches and group designations; and (3) those based on the outcome variables—the best tests.

The first category includes goodness-of-fit measures for the parameter estimates from the logit models. For each model, we examine the pseudo-R^2 value (which is based on the likelihood ratio statistic and can range from 0 to 1) and the magnitude and statistical significance of the estimated parameters. If a model has a large pseudo-R^2 value and many significant and large estimated parameters, then the explanatory variables in the model can effectively distinguish between high- and low-dosage families. In this case, the propensity scoring procedure may produce unbiased estimates, because many sample members are likely to be classified correctly. The problem with these goodness-of-fit measures, however, is that a low pseudo-R^2 value or few significant explanatory variables does not necessarily imply that the propensity scoring approach is unsuccessful, because there may, in fact, be few differences between those who received intensive services and those who did not. Furthermore, even if the goodness-of-fit measures are favorable, the propensity scoring procedure may not be successful if the explanatory variables are not highly correlated with the outcome variables (which is usually the case; see Chapter II).

The second category of goodness-of-fit measures are based on the quality of the matches and group designations. We conducted the following tests:

1. ***For the matching method, we compared, for each service intensity group, the distribution of the explanatory variables and propensity scores of program group members and their matched controls within each of five propensity scoring groups.*** We sorted the program group on the basis of their propensity scores from largest to smallest, and used this ordering to divide the program group into five propensity scoring groups of equal size. This analysis was done separately for high- and low-dosage program group families. We then compared the distribution of the baseline characteristics and propensity scores of program families and their matched controls within each propensity scoring group. If the matching process was determined to be unsatisfactory on the basis of these statistical tests, we re-estimated the logit regression models by including interaction terms as additional explanatory variables in the models (see Dehejia and Wahba 1999; Rubin 2001). The process was continued until a satisfactory model specification was found.

2. ***For the matching method, we computed the proportion of matched controls who were assigned to both the high-service and low-service intensity groups.*** As discussed, the matching process was conducted with replacement so that a control group family could be a match for more than one program group family. The overlap between matched controls in the low- and high-dosage groups should be less for models that predict well than for models with less predictive power. Thus, we compared the overlap from our matching process to the overlap that would be expected if controls were *randomly* matched with replacement to each program group family. Similarly, we calculated the percentage of all control group members who were in the matched control group samples.

3. ***For the cutoff method, we examined the proportion of program group families who were "assigned" to the high-dosage group who actually received intensive services, and similarly for program group families who were assigned to the low-dosage group.*** These proportions (that is, correct classification rates) were compared to the correct classification rates that would be expected if program group families were *randomly* assigned to the two dosage groups.

The final category of goodness-of-fit tests are based on the mean values of, and the impacts on, the outcome variables. Because these tests are based directly on the outcomes of interest, they are the best tests to assess the success of the propensity scoring procedure. Specifically, we conducted the following tests:

1. ***For the matching method, we tested, for each outcome measure, whether the weighted average of the mean outcome for the controls in the high- and low-dosage groups equals the mean outcome for the full control group.*** The aim of the matching method is to *partition the full* control group into two dosage groups. Thus, if this procedure was successful, the weighted average of the mean outcome for controls in the two dosage groups should equal the mean outcome for the *full* control group, where the weights are .33 and .67, respectively. Similarly, we assessed whether the weighted average of the *impact* estimates for the two dosage groups are similar to the impact estimates for the full sample, as should be the case for any subgroup analysis that divides the sample into mutually exclusive groups.

2. ***For the cutoff method, we compared the mean outcomes of "predicted" high-dosage (low-dosage) program group members to those of actual high-dosage (low-dosage) program group members.*** We expect that, if the mean outcomes for those in the "predicted" and "actual" dosage groups are similar for the program group, then it is likely that the mean outcomes for control group families in the two dosage groups are also accurate, and hence, that unbiased impact estimates can be obtained.

3. ***We compared impact results using the cutoff method and matching methods.*** As discussed, the cutoff and matching methods should yield similar impact results because they are both based on the same propensity scores and both partition the sample into two dosage groups.[12]

b. Fixed-Effects Method

In order to test the robustness of our findings using the propensity scoring approach, we also estimated dosage effects by (1) calculating, for each program group member, the difference between their 14- and 36-month outcomes (that is, the growth in their outcomes), and (2) comparing the mean difference in these growth rates for those who received intensive services and those who did not. This "fixed-effects" or "difference-in-difference" approach adjusts for selection bias by assuming that permanent unobservable differences between families in the two service intensity groups are captured by their 14-month measures. This analysis was conducted using only those outcomes that were measured at multiple time points.

Mathematically, dosage effects using the fixed-effects approach were obtained using variants of the following model:

$$(5)\ (y_{36} - y_{14}) = \alpha_0 + \alpha_1 H + X\beta + \varepsilon,$$

where y_{36} is the outcome at 36 months, y_{14} is the outcome at 14 months, H is an indicator variable equal to 1 for high service-intensity program group members and to 0 for low service-intensity program group members, Xs are explanatory variables, ε is the disturbance term, and the αs and βs are parameters to be estimated. In some specifications, we did not include the explanatory variables (that is, the *X*s), and in other specifications we included the 14-month outcome measure as an explanatory variable rather than as part of the dependent variable. The parameter, α_1, represents the difference in the growth of the outcome between high-service intensity and low-service intensity program group members (that is, the dosage effect).

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[12] An additional test that could be conducted for both the cutoff and matching methods is to test whether impacts on those who received *no* services were zero. In order to conduct this test, however, we would have needed to conduct the analysis using *three* service groups (received no services, received few services, and received intensive services) rather than two. However,

Although intuitively appealing and widely used, this approach has several serious problems in our context. First, ideally, we would want to use *baseline* measures of the outcomes rather than 14-month measures, because program group families had already received some services at the 14-month point. Furthermore, the high service-intensity group had received more services on average than the low service-intensity group. Thus, the 14-month measures for the two groups are likely to have already been affected by Early Head Start in different ways, which could lead to biased estimates of dosage effects. Second, the fixed-effects approach assumes that in the *absence* of Early Head Start, the growth trajectories of outcomes for the low and high service-intensity groups would have been similar. This assumption, however, may not be realistic for some outcome measures. Finally, this analysis is restricted to those who have available data at 14 and 36 months.

c. Measures of Service Intensity

As discussed in Chapter II of Volume I, we estimated dosage effects using two overall measures of service intensity. First, we constructed a measure using data from the PSI and exit interviews. Families were categorized as receiving intensive services if they remained in the program for at least two years and received more than a threshold level of services. The threshold level for those in center-based sites was the receipt at least 900 total hours of Early

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because fewer than 10 percent of the program group received no Early Head Start services, we

Head Start center care during the 26-month follow-up period. The threshold level for those in home-based sites was the receipt of home visits at least weekly in at least two of the three follow-up periods. Families categorized as receiving intensive services in mixed-approach sites were those who exceeded the threshold level for either center-based or home-based services. About one-third of program group families received intensive services using this definition. The service intensity rate varied from 8 to 56 percent across sites, but 9 of the 17 sites had a rate greater than 33 percent. This measure is missing for about 8 percent of program group families.

Second, we used a measure of program engagement provided by the sites for each family in the program group. Program staff rated each family as (1) consistently highly involved throughout their enrollment, (2) involved at varying levels during their enrollment, (3) consistently involved at a low level throughout their enrollment, (4) not involved in the program at all, or (5) they could not remember how involved the family was. Those 40 percent of families who were rated as consistently highly involved were considered to have received intensive services in our analysis. The program engagement rate ranged from 20 to 77 percent across sites, although 10 sites had a rate greater than 40 percent. The program engagement measure is missing for 7 percent of program group families.

There is some overlap between the two intensity measures, although there are many families who are classified as having receiving intensive services according to one measure but not the other. For example, about 58 percent of those classified as high dosage using the PSI measure were also classified as high dosage using the program engagement measure. Similarly, about half of those classified as high dosage using the PSI measure were also classified as high dosage using the PSI measure.

(continued)

did not conduct this analysis.

The lack of perfect overlap between the two intensity measures reflects the different aspects of program involvement that they measure. The first measure is based on duration of enrollment and hours of center care or frequency of home visits and reflects the quantity of services received, while the second measure captures staff assessments of families' level of involvement in program services in terms of both attendance and emotional engagement in program activities.

To keep the presentation manageable, we present impact estimates for 28 key outcome variables spanning a range of types of outcomes.

2. Analysis Results

In this section, we first report results from the logit models, then present the impact findings.

a. Logit Model Results and Goodness-of-Fit Tests

Table D.7A displays, for each measure of service intensity, results from a logit model where the probability that a program group family received intensive services was regressed on family, child, and site characteristics. For ease of presentation, these models are a *simplified* version of the models actually used in the propensity scoring analysis, which included additional explanatory variables (see the previous section) and site indicator variables (rather than variables signifying key site characteristics). The table displays the regression-adjusted probability that a family received intensive services (that is, marginal probabilities) for each family, child, and site characteristic included in the models. The table also displays the significance of these marginal probabilities.

The parameter estimates on the explanatory variables are *jointly* statistically significant at the 1 percent significance level. This result holds for both the PSI intensity measure and the program engagement measure.

TABLE D.7A

REGRESSION-ADJUSTED PROBABILITY THAT A PROGRAM GROUP FAMILY RECEIVED INTENSIVE EHS SERVICES, BY SERVICE INTENSITY MEASURE AND SUBGROUP

(Percentages)

Variable[1]	Probability Family Received Intensive Services	
	Self-Reported PSI Measure	Program Engagement Measure
Total	32.7	40.3
Site Characteristics		
Program Approach		
Center-based	26.9	43.6
Home-based	39.0**	34.3***
Mixed (L)	28.5	46.1
Overall Implementation Level		
Early	40.6***	45.2
Late	32.8**	35.4
Incomplete (L)	21.9	40.9
Urban or Rural		
Urban	32.2	41.2
Rural (L)	33.2	39.4
Unemployment Rate		
Higher than 5 percent	22.9***	48.2**
5 percent of less (L)	35.7	38.1
Family and Parent Characteristics		
Mother's Age at Birth of Focus Child		
Less than 20	35.8	36.4
20 to 25	30.1	41.2
Older than 25 (L)	31.7	44.0
Race and Ethnicity		
White non-Hispanic (L)	34.2	40.6
Black non-Hispanic	30.4	36.3
Hispanic	35.1	46.0
Other	21.5**	34.4
Primary Language		
English	32.9	41.0
Other (L)	31.9	38.2
Mother's Education		
Less than grade 12 (L)	27.0	36.6
Grade 12 or earned a GED	39.8***	41.2
Greater than grade 12	35.2*	45.8*
Primary Occupation		
Employed (L)	33.3	48.6
In school or training	35.8	41.0
Neither	31.2	36.5***

TABLE D.7.A *(continued)*

Variable[1]	Probability Family Received Intensive Services Self-Reported PSI Measure	Probability Family Received Intensive Services Program Engagement Measure
Living Arrangements		
With spouse	33.5	44.8
With other adults	34.7	36.9
Alone (L)	29.8	40.5
Received AFDC/TANF		
Yes	29.6	37.8
No (L)	33.9	41.3
Received Food Stamps		
Yes	32.5	38.0
No (L)	32.8	42.2
Random Assignment Date		
Before 10/96 (L)	38.2	45.3
10/96 to 6/97	30.3**	35.3**
After 6/97	28.8**	39.8
Child Characteristics		
Age of Focus Child		
Unborn	30.0	35.7
Less than 5 months	33.3	40.1
5 months or older (L)	33.9	43.3
First Born		
Yes	29.7**	40.1
No (L)	37.6	40.7
Gender		
Male	32.9	41.0
Female (L)	32.4	39.7
Mother or Anyone Else Had Concerns About Child's Overall Health and Development		
Yes	34.4	42.2
No (L)	32.5	40.2
Child Received an Evaluation Because of Concerns About the Child's Overall Health and Development or Because of Suspected Developmental Delay		
Yes	37.1	40.8
No	32.5	40.3
Has Established or Biological/Medical Risks		
Yes	30.0	38.5
No	33.1	40.7
Sample Size	**1,076 Program Group Families**	**1,076 Program Group Families**

SOURCE: HSFIS and PSI Data

TABLE D.7.A *(continued)*

NOTES:

1. All estimates are regression-adjusted using logistic regression procedures where the probability a family in the program group received intensive services was regressed on the explanatory variables listed in the table.

2. For the PSI measure, families were categorized as receiving intensive services if they remained in the program for at least two years and received more than a threshold level of services. The threshold level for those in center-based sites was the receipt at least 900 total hours of Early Head Start center care during the 26-month follow-up period. The threshold level for those in home-based sites was the receipt of home visits at least weekly in at least 2 of the 3 follow-up periods. Families categorized as receiving intensive services in mixed-approach sites were those who exceeded the threshold level for either center-based or home-based services.

   The program engagement measure pertains to the family's level of engagement in Early Head Start as reported by site staff.

[1] An "L" signifies that the variable was left out of the regression models

*Difference between the regression-adjusted percentage for the subgroup relative to the percentage for the left-out subgroup is statistically significant at the .10 level, two-tailed test

**Difference between the regression-adjusted percentage for the subgroup relative to the percentage for the left-out subgroup is statistically significant at the .05 level, two-tailed test

***Difference between the regression-adjusted percentage for the subgroup relative to the percentage for the left-out subgroup is statistically significant at the .01 level, two-tailed test

We find some differences in service intensity levels across sites. Families in home-based programs were more likely to receive intensive services than those in center-based or mixed programs using the PSI intensity measure, but the opposite result holds using the program engagement measure. There is some evidence that service intensity levels were higher for families in sites that were early implementers than for families in other sites.

We find that better-off families were somewhat more likely to receive intensive services than were more disadvantaged families. For example, families were more likely to receive intensity services if the mother (1) had a high school degree, (2) was employed (for the program engagement measure), (3) was not receiving welfare, and (4) was living with her spouse or other adults. Importantly, however, the subgroup differences are not large, and few of the other family and child measures are statistically significant. The pseudo-R^2 values from the logit models used in the propensity scoring analysis are about .12 for both service intensity measures. These relatively low values suggest that the explanatory variables included in the models do not have substantial predictive power. As a further illustration of this point, only about 58 percent of those predicted to be in the high dosage group using the cutoff method actually received high-intensity services (using the PSI measure). This correct classification rate is substantially larger than the 33 percent that would be expected if random classifications were performed, but still suggests that the predicted high-dosage group contains a substantial number of misclassified families (and similarly for the low-dosage group).[13]

For the matching method, we find that the distributions of the baseline characteristics of program group families and their matched controls are similar for each service intensity group (see Table D.7B which shows results for the PSI measure). Very few of the differences in key

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[13] The correct classification rate for those who were classified as low dosage is about 80 percent. The correct classification rates are similar using the program engagement measure.

TABLE D.7B

DISTRIBUTION OF THE CHARACTERISTICS OF PROGRAM GROUP FAMILIES AND THEIR MATCHED CONTROLS, BY SERVICE INTENSITY LEVEL (USING THE PSI MEASURE)

	High-Dosage Group		Low-Dosage Group		
Variable	Program Group	Matched Control Group	Program Group	Matched Control Group	All Controls
Site Characteristics					
Program Approach					
Center-based	16.7	17.3	22.8	24.3	20.2
Home-based	49.7	51.5	43.3	41.2	44.8
Mixed	33.6	31.2	34.0	34.6	35.0
Overall Implementation Level					
Early	44.8	39.8	30.7	32.6	36.3
Late	35.8	41.0	41.3	36.4	37.0
Incomplete	19.4	19.1	28.0	31.0	26.7
Urban	51.2	47.2	57.6	63.6**	58.2
Unemployment Rate Higher than 5 Percent	17.3	19.4	25.3	25.9	21.9
Family and Parent Characteristics					
Mother's Age at Birth of Focus Child					
Less than 20	37.0	36.5	39.5	42.4	38.9
20 to 25	33.8	34.6	31.8	30.4	33.4
Older than 25	29.3	28.8	28.7	27.2	27.8
Race and Ethnicity					
White non-Hispanic	47.8	47.9	35.0	29.4*	38.2
Black non-Hispanic	28.2	30.7	36.2	41.8	34.1
Hispanic	21.5	18.2	24.5	23.0	22.8
Other	2.5	3.2	4.4	5.8	4.9
Primary Language is English	83.0	80.9	77.7	77.7	78.2
Mother's Education					
Less than grade 12	38.0	39.3	49.9	53.9	46.2
Grade 12 or earned a GED	34.5	31.0	25.0	23.4	29.2
Greater than grade 12	27.5	29.7	25.1	22.7	24.6
Primary Occupation					
Employed	25.2	24.2	22.5	21.1	23.2
In school or training	21.7	23.9	23.1	26.6	21.0
Neither	53.2	51.9	54.4	52.3	55.8

TABLE D.7B (*continued*)

Variable	High-Dosage Group Program Group	High-Dosage Group Matched Control Group	Low-Dosage Group Program Group	Low-Dosage Group Matched Control Group	All Controls
Living Arrangements					
With spouse	30.9	27.8	24.6	23.2	26.9
With other adults	38.9	43.5	38.9	40.0	40.4
Alone	30.2	28.7	36.5	36.8	32.7
Received AFDC/TANF	30.0	27.1	35.4	35.4	33.2
Received Food Stamps	43.9	44.4	46.2	53.1**	46.8
Random Assignment Date					
Before 10/96	42.9	38.9	32.8	31.0	35.4
10/96 to 6/97	29.6	34.6	31.3	32.6	32.3
After 6/97	27.5	26.5	35.9	36.4	32.3
Child Characteristics					
Age of Focus Child					
Unborn	25.9	30.9	24.6	24.7	27.5
Less than 5 months	33.0	29.6	35.3	38.6	34.2
5 months or older	41.0	39.5	40.1	36.7	38.3
First Born	58.1	53.9	63.7	66.3	60.6
Male	50.9	46.9	49.9	48.8	50.3
Mother or Anyone Else Had Concerns About Child's Overall Health and Development	12.4	12.0	12.2	14.8	14.6
Child Received an Evaluation Because of Concerns About the Child's Overall Health and Development or Because of Suspected Developmental Delay	5.7	8.2	5.4	5.5	6.4
Has Established or Biological/Medical Risks	19.6	21.2	22.0	21.4	19.8
Sample Size	**324**	**324**	**668**	**668**	**1,011**

SOURCE: PSI and HSFIS data.

NOTE: Controls were matched to program group families with replacement using the propensity scoring approach (matching method) described in the text.

*Difference between program and matched control group is significantly different from zero at the .10 level, two-tailed test

** Difference between program and matched control group is significantly different from zero at the .05 level, two-tailed test.

*** Difference between program and matched control group is significantly different from zero at the .01 level, two-tailed test.

639

family and child characteristics between program and control group families in each dosage group are statistically significant, and program group members are clearly more similar to their matched controls than to the *full* control group. Thus, the procedure succeeded in producing equivalent groups on the basis of *observable* characteristics. However, only about 55 percent of control group families were matched to program group families, which is much lower than one might expect. Furthermore, the overlap in the matched high- and low-dosage control group samples is about 12 percent of the full control group, which is not substantially smaller than the 15 percent that would be expected if random matching were performed.

In sum, the goodness-of-fit tests based on the logit regression results yield mixed results about the success of the propensity scoring procedure, but on the whole, are disappointing. On the positive side, the parameter estimates on the explanatory variables are jointly significant. Furthermore, the matching method yielded program and matched control group families with similar observable characteristics within each service intensity group. However, the pseudo-R^2 values from the logit models are low (about .12); many program group families were misclassified to the high- and low-dosage groups using the cutoff method, and only slightly more than half of control group families were matched to program group families using the matching method. In addition, many of the parameters in the logit models are not statistically significant.

The results from the goodness-of-fit tests based on the outcome measures are also mixed. Table D.7C displays test results for the matching method where mean outcomes for the full control group are compared to the weighted averages of the mean outcomes for the matched controls in the low- and high-dosage groups. We find that, as expected, the mean outcomes of matched controls in the high-dosage group usually were more favorable than for those in the low-dosage group, because, as discussed, those in the high-dosage group were somewhat less disadvantaged. The differences between the full control group mean outcomes and the weighted averages of the mean outcomes for the two dosage groups usually are small in nominal terms,

TABLE D.7C

MEAN OUTCOMES OF MATCHED CONTROL GROUP FAMILIES AND THE FULL CONTROL GROUP, BY SERVICE INTENSITY LEVEL (USING THE PSI MEASURE)

Variable	High-Service Intensity Controls (1)	Low-Service Intensity Controls (2)	Weighted Average of (1) and (2) (3)	Full Control Group (4)	Error {(3)-(4)} as a Percent of the Impact on the Outcome
Bayley Mental Development Index (MDI)	92.02	89.36	90.46	90.16	28
Percentage with Bayley MDI Below 85	29.65	34.07	32.24	31.55	-24
PSI: Parental Distress	25.80	25.09	25.39	25.55	-50
Center for Epidemiologic Studies Depression Scale (CES-D) Total Score	8.13	7.47	7.74	7.91	-46
Percentage of Parents Who Spanked the Child in the Previous Week	52.11	51.37	51.68	53.44	-30
Index of Severity of Discipline Strategies	3.29	3.55	3.44	3.47	-27
Percentage of Parents Suggesting Only Mild Responses to Hypothetical Situations	48.70	39.65	43.40	41.97	33
Percentage of Parents Who Read to Their Child Every Day	53.23	49.91	51.29	51.80	14
Home Observation for Measurement of the Environment (HOME): Total Score	26.64	26.36	26.48	26.93	90
HOME: Support of Language and Learning	10.05	10.16	10.12	10.35	100
HOME: Warmth	2.36	2.44	2.41	2.48	100
Parent Supportiveness (Semistructured Play)	3.89	3.78	3.82	3.87	63
Parent Intrusiveness (Semistructured Play)	1.76	1.58	1.66	1.59	NA
Parent Detachment (Semistructured Play)	1.32	1.31	1.32	1.25	-350

TABLE D.7C (*continued*)

Variable	High-Service Intensity Controls (1)	Low-Service Intensity Controls (2)	Weighted Average of (1) and (2) (3)	Full Control Group (4)	Error {(3)-(4)} as a Percent of the Impact on the Outcome
Parent Engagement (Semistructured Play)	4.54	4.60	4.57	4.63	50
Sustained Attention with Objects (Semistructured Play)	4.73	4.74	4.74	4.83	90
Negativity Toward Parent (Semistructured Play)	1.48	1.30	1.38	1.31	-117
Persistence (Puzzle Challenge Task)	4.58	4.46	4.51	4.55	-400
Child Behavior Checklist: Aggressive Behavior	11.17	11.26	11.22	11.30	-25
Peabody Picture Vocabulary Test (PPVT-III) Standard Score	83.89	82.16	82.88	82.49	27
Percentage with PPVT <85	51.40	56.15	54.18	53.27	-26
Percentage of Caregivers Ever Employed During the 26 Months After Random Assignment	81.73	82.34	82.09	83.04	35
Percentage of Caregivers Ever in an Education or Training Program During the 26 Months After Random Assignment	54.06	51.00	52.27	50.25	25
Average Parent-Reported Health Status of Child	4.07	4.09	4.08	4.02	-600
Continuous Biological Father Presence Child Age 14 to 36 Months	75.00	67.06	70.35	70.25	-3
Continuous Male Presence Child Age 14 to 36 Months	90.61	81.34	85.18	84.89	-7
Sample Size	**324**	**668**		**1,011**	

TABLE D.7C (*continued*)

SOURCE: PSI and PI Data and Bayley and Video Assessments at 36 Months.

NOTE: Controls were matched to program group families with replacement using the propensity scoring approach (matching method) described in the text.

NA = Not applicable because the impact was zero for the outcome variable.

but are often large relative to the estimated full sample *impacts* on the outcomes. This suggests that the estimates of dosage effects may be biased. We find similar results when the mean outcomes of program group families predicted to be in a particular dosage group using the cutoff method are compared to the mean outcomes of program group families who were actually in that dosage group (see Table D.7D).

b. Impact Results

The impact results using the matching method strongly suggest that service intensity matters (Tables D.7E and D.7F). Across a wide range of outcome variables, the estimated impacts are more beneficial for those in the high dosage group than for those in the low dosage group. For example, the impact on the Bayley MDI was 2.35 points and statistically significant at the 5 percent level for those in the high dosage group, but was only 0.39 points and statistically insignificant for those in the low dosage group. Similarly, the impact was more than 3 points on the PPVT for the high dosage group, but was small and statistically insignificant for those in the low dosage group. A similar pattern exists across other key child and family outcomes, and exists for both the PSI intensity measure and the program engagement measure. The results using the fixed effects method support the findings using the matching method for some outcomes.

The findings using the cutoff method, however, do *not* support the conclusion that program impacts were larger for those families who received intensive services than for families who received less intensive or no services. There is no evidence that the estimated impacts using the cutoff method were systematically larger for those in the high dosage group than for those in the low dosage group for either the PSI or program engagement measure.

In sum, it is unclear whether impacts for the full sample are concentrated in those families who received substantial amounts of Early Head Start services. We do find evidence of dosage effects using one version of the propensity scoring approach (the matching method), but do not

TABLE D.7D

COMPARING THE MEAN OUTCOMES OF PROGRAM GROUP FAMILIES PREDICTED TO BE IN A SERVICE INTENSITY GROUP TO THE MEAN OUTCOMES OF THOSE ACTUALLY IN THAT GROUP (USING THE CUTOFF METHOD AND THE PSI MEASURE)

	High-Service Intensity Group		Low-Service Intensity Group		
Variable	Predicted	Actual	Predicted	Actual	Full Program Group
Bayley Mental Development Index (MDI)	94.14	93.08	89.92	90.27	91.25
Percentage with Bayley MDI Below 85	20.18	22.62	32.66	31.99	28.73
PSI: Parental Distress	25.12	24.69	25.29	25.51	25.23
Center for Epidemiologic Studies Depression Scale (CES-D) Total Score	7.76	7.26	7.42	7.67	7.53
Percentage of Parents Who Spanked the Child in the Previous Week	37.33	40.68	52.68	51.04	47.53
Index of Severity of Discipline Strategies	2.95	3.09	3.57	3.50	3.36
Percentage of Parents Suggesting Only Mild Responses to Hypothetical Situations	57.38	53.11	38.45	40.40	44.69
Percentage of Parents Who Read to Their Child Every Day	60.48	61.02	52.93	52.61	55.41
Home Observation for Measurement of the Environment (HOME): Total Score	28.00	27.97	27.14	27.13	27.42
HOME: Support of Language and Learning	10.83	10.78	10.46	10.48	10.58
HOME: Warmth	2.53	2.55	2.56	2.56	2.55
Parent Supportiveness (Semistructured Play)	4.11	4.05	3.87	3.89	3.95
Parent Intrusiveness (Semistructured Play)	1.44	1.53	1.67	1.63	1.60
Parent Detachment (Semistructured Play)	1.21	1.27	1.24	1.21	1.23

TABLE D.7D (*continued*)

	High-Service Intensity Group		Low-Service Intensity Group		
Variable	Predicted	Actual	Predicted	Actual	Full Program Group
Parent Engagement (Semistructured Play)	4.90	4.83	4.68	4.72	4.75
Sustained Attention with Objects (Semistructured Play)	5.08	5.07	4.84	4.84	4.92
Negativity Toward Parent (Semistructured Play)	1.19	1.28	1.29	1.25	1.26
Persistence (Puzzle Challenge Task)	4.77	4.78	4.43	4.41	4.54
Child Behavior Checklist: Aggressive Behavior	11.60	10.75	10.68	11.10	10.98
Peabody Picture Vocabulary Test (PPVT-III) Standard Score	86.00	86.06	82.77	82.61	83.90
Percentage with PPVT <85	44.44	44.59	52.62	52.85	49.76
Percentage of Caregivers Ever Employed During the 26 Months After Random Assignment	85.45	87.35	85.93	85.01	85.77
Percentage of Caregivers Ever in an Education or Training Program During the 26 Months After Random Assignment	57.99	58.31	58.66	58.51	58.44
Average Parent-Reported Health Status of Child	4.06	4.03	3.99	4.01	4.01
Continuous Biological Father Presence Child Age 14 to 36 Months	70.35	69.46	64.87	65.22	66.77
Continuous Male Presence Child Age 14 to 36 Months	80.43	84.52	80.48	78.13	80.46
Sample Size	**324**	**324**	**668**	**668**	**992**

SOURCE: PSI and PI Data and Bayley and Video Assessments at 36 Months.

NOTE: Analysis was conducted using program group families only. Families were predicted to be in the high- or low-service intensity group on the basis of the size of their propensity scores and using the cutoff method described in the text.

TABLE D.7E

IMPACT ESTIMATES FOR THE HIGH AND LOW DOSAGE GROUPS USING THE SELF-REPORTED PSI INTENSITY MEASURE, BY ESTIMATION METHOD

		Matching Method			Cutoff Method			Fixed-Effects Method
Variable	Impact for the Full Sample[a]	High Dosage Group	Low Dosage Group	Difference	High Dosage Group	Low Dosage Group	Difference	Average Difference Between the High and Low Dosage Groups[b]
Bayley Mental Development Index (MDI)	1.53**	0.95	0.72	0.23	0.72	1.76**	-1.04	0.22
Percentage with Bayley MDI Below 85	-4.19*	-6.76	-0.73	-6.03	-3.59	-4.83*	1.24	NA
PSI: Parental Distress	-0.40	-1.32*	-0.03	-1.29	-1.52*	-0.09	-1.43	-0.48
Center for Epidemiologic Studies Depression Scale (CES-D) Total Score	-0.38	-1.20**	0.02	-1.23*	-1.19*	-0.11	-1.07	NA
Percentage of Parents Who Spanked the Child in the Previous Week	-6.07**	-10.87***	-1.70	-9.17*	-6.59	-5.55*	-1.04	NA
Index of Severity of Discipline Strategies	-0.13*	-0.19	-0.06	-0.13	-0.02	-0.14*	0.12	NA
Percentage of Parents Suggesting Only Mild Responses to Hypothetical Situations	2.91	2.98	1.42	1.56	-1.57	3.69	-5.26	NA
Percentage of Parents Who Read to Their Child Every Day	4.16*	7.23*	4.06	3.17	3.48	5.31*	-1.83	NA
Home Observation for Measurement of the Environment (HOME): Total Score	0.39*	0.99***	0.82***	0.16	0.18	0.49*	-0.31	0.38
HOME: Support of Language and Learning	0.20**	0.53***	0.30***	0.23	0.17	0.19*	-0.02	0.11
HOME: Warmth	0.06	0.18**	0.11**	0.17	0.07	0.06	0.01	NA
Parent Supportiveness (Semistructured Play)	0.08*	0.11	0.14**	-0.03	0.11	0.07	0.03	-0.04
Parent Intrusiveness (Semistructured Play)	-0.01	-0.22***	0.07	-0.28***	-0.11	0.05	-0.16*	0.05
Parent Detachment (Semistructured Play)	-0.02	-0.06	-0.10**	0.04	0.05	-0.05	0.09	0.12**

TABLE D.7E (*continued*)

Variable	Impact for the Full Sample[a]	Matching Method: High Dosage Group	Matching Method: Low Dosage Group	Matching Method: Difference	Cutoff Method: High Dosage Group	Cutoff Method: Low Dosage Group	Cutoff Method: Difference	Fixed-Effects Method: Average Difference Between the High and Low Dosage Groups[b]
Parent Engagement (Semistructured Play)	0.14**	0.31***	0.14**	0.17	0.20*	0.12*	0.08	-0.06
Sustained Attention with Objects (Semistructured Play)	0.10**	0.20**	0.11*	0.09	0.09	0.09	0.00	0.07
Negativity Toward Parent (Semistructured Play)	-0.07**	-0.24***	-0.06	-0.18**	-0.13**	-0.03	-0.10	0.09
Persistence (Puzzle Challenge Task)	0.01	0.27***	-0.07	0.34**	0.03	0.00	0.03	NA
Child Behavior Checklist: Aggressive Behavior	-0.38	-0.46	-0.36	-0.10	-0.06	-0.62	0.56	NA
Peabody Picture Vocabulary Test (PPVT-III) Standard Score	1.68**	2.91**	0.84	2.08	1.64	1.84*	-0.20	NA
Percentage with PPVT <85	-4.16	-9.43*	-3.21	-6.21	-4.37	-4.07	-0.30	NA
Percentage of Caregivers Ever Employed During the 26 Months After Random Assignment	2.77*	6.40**	2.33	4.07	1.03	3.63*	-2.60	NA
Percentage of Caregivers Ever in an Education or Training Program During the 26 Months After Random Assignment	7.48***	6.53*	8.86***	-2.33	7.97**	7.09***	0.89	NA
Average Parent-Reported Health Status of Child	-0.01	-0.05	-0.07	0.01	0.02	-0.03	0.04	NA
Continuous Biological Father Presence Child Age 14 to 36 Months	-1.68	-6.45	0.41	-6.86	-4.85	-0.20	-4.65	NA
Continuous Male Presence Child Age 14 to 36 Months	-3.74*	-5.88*	-2.71	-3.18	-0.64	-10.58**	-10.58**	NA

TABLE D.7E (*continued*)

SOURCE: PSI and PI data and Bayley and Video Assessments at 36 Months.

NOTE: See text for a discussion of the three estimation approaches. All impacts are estimated using regression models where sites are weighted by their sample sizes.

[a] Program group members who have missing values for the service intensity measure are excluded from the analysis, because these families were excluded from the analyses using the matching and cutoff methods.

[b] Sample includes those who had available data at 14 and 36 months.

NA = Not applicable

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE D.7F

IMPACT ESTIMATES FOR THE HIGH AND LOW DOSAGE GROUPS USING THE PROGRAM ENGAGEMENT MEASURE, BY ESTIMATION METHOD

		Matching Method			Cutoff Method			Fixed-Effects Method
Variable	Impact for the Full Sample[a]	High Dosage Group	Low Dosage Group	Difference	High Dosage Group	Low Dosage Group	Difference	Average Difference Between the High and Low Dosage Groups[b]
Bayley Mental Development Index (MDI)	1.74***	2.35**	0.39	1.95	1.40	1.85**	-0.45	1.84*
Bayley Language Factor	0.61***	0.72***	0.33*	0.39	-.87***	0.44**	0.43	NA
PSI: Parental Distress	-0.40	-0.74	-0.37	-0.38	-0.04	-0.61	0.58	-.07
Center for Epidemiologic Studies Depression Scale (CES-D) Total Score	-0.39	-0.85	-0.01	-0.84	0.15	-0.74*	0.89	NA
Percentage of Parents Who Spanked the Child in the Previous Week	-5.67**	-10.37***	-4.10	-6.27	-5.66	-6.61**	0.95	NA
Index of Severity of Discipline Strategies	-0.15**	-0.25**	-0.17*	-0.08	-0.09	-0.19**	0.10	NA
Percentage of Parents Suggesting Only Mild Responses to Hypothetical Situations	3.56*	6.08*	6.90**	-0.83	0.96	4.94*	-3.98	NA
Percentage of Parents Who Read to Their Child Every Day	5.66**	10.57***	1.47	9.09*	8.23**	4.10	4.13	NA
Home Observation for Measurement of the Environment (HOME): Total Score	0.52**	1.37***	0.19	1.17***	0.69**	0.47*	0.23	0.62*
HOME: Support of Language and Learning	0.23**	0.36**	0.16	0.20	0.25*	0.23*	0.03	.43***
HOME: Warmth	0.09**	0.16***	0.04	0.12	0.06	0.11**	-0.05	NA
Parent Supportiveness (Semistructured Play)	0.10**	0.13	0.00	0.12	0.11	0.10	0.01	0.17**
Parent Intrusiveness (Semistructured Play)	-0.02	-0.06	0.15***	-0.22***	-0.12*	0.06	-0.18**	-0.09
Parent Detachment (Semistructured Play)	-0.01	-0.02	-0.05	0.03	0.00	-0.02	0.02	-0.04
Parent Engagement (Semistructured Play)	0.15***	0.12	0.11	0.01	0.15*	0.17**	-0.02	0.16*

TABLE D.7F (*continued*)

Variable	Impact for the Full Sample[a]	Matching Method			Cutoff Method			Fixed-Effects Method
		High Dosage Group	Low Dosage Group	Difference	High Dosage Group	Low Dosage Group	Difference	Average Difference Between the High and Low Dosage Groups[b]
Sustained Attention with Objects (Semistructured Play)	0.13***	0.04	0.09	-0.05	0.12	0.14**	-0.03	0.09
Negativity Toward Parent (Semistructured Play)	-0.08**	-0.06	-0.03	-0.03	-0.07*	-0.07	-0.01	-0.04
Persistence (Puzzle Challenge Task)	0.01	0.07	0.00	0.07	-0.03	0.03	-0.06	NA
Child Behavior Checklist: Aggressive Behavior	-0.33	-0.25	-0.57	0.32	-0.28	-0.56	0.28	NA
Peabody Picture Vocabulary Test (PPVT-III) Standard Score	1.66**	3.15**	-0.56	3.71**	2.54*	1.35	1.19	NA
Percentage with PPVT <85	-4.08	-11.01**	4.23	-15.25***	-3.34	-5.17	1.83	NA
Percentage of Caregivers Ever Employed During the 26 Months After Random Assignment	2.45	4.06	3.39	0.67	4.44*	0.80	3.64	NA
Percentage of Caregivers Ever in an Education or Training Program During the 26 Months After Random Assignment	7.55***	3.07	4.05	-0.98	7.35**	6.79***	0.56	NA
Average Parent-Reported Health Status of Child	0.00	0.06	0.13**	-0.07	-0.09	0.04	-0.13	NA
Continuous Biological Father Presence Child Age 14 to 36 Months	-1.09	3.68	-5.67*	9.35*	0.24	-2.55	2.78	NA
Continuous Male Presence Child Age 14 to 36 Months	-3.74*	-2.58	-7.49*	4.91	-2.28	-4.93*	2.65	NA

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TABLE D.7F (*continued*)

SOURCE: PSI and PI data and Bayley and Video Assessments at 36 Months.

NOTE: See text for a discussion of the three estimation approaches. All impacts are estimated using regression models where sites are weighted by their sample sizes.

[a] Program group members who have missing values for the service intensity measure are excluded from the analysis, because these families were excluded from the analyses using the matching and cutoff methods.

[b] Sample includes those who had available data at 14 and 36 months.

NA = Not applicable

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

find this evidence using another version of this approach (the cutoff method). Furthermore, the goodness-of-fit statistics for the propensity scoring approach provide mixed—but, on the whole, disappointing—results about the success of this method for generating unbiased estimates of dosage effects. In short, it is very difficult to model service intensity on the basis of the available baseline data. Thus, we believe that the findings of dosage effects using the matching method are open to question.

D.8 RESULTS FROM RERUN OF 24-MONTH CHILD AND FAMILY OUTCOMES

Data on child and family outcomes based on the 24-Month Parent Interview were not complete at the time the Early Head Start interim report was written. Approximately 100 records from a number of sites were added to the sample after publication of the interim report. To ensure consistency of results, we reanalyzed the impact of Early Head Start programs on child and family outcomes at 24 months using this slightly augmented sample. The results of those analyses are consistent with the findings presented in the interim report, as summarized here.

1. Early Head Start Impacts for the Entire Sample

There were no dramatic changes in the impact of Early Head Start programs on the entire sample. Results are detailed in Tables D.8A through D.8H. Some of the smaller changes are:

- Some effects sizes for child cognitive outcomes (the Bayley MDI and MacArthur vocabulary and sentence complexity) became slightly larger and more statistically significant (Table D.8A). Early Head Start children scored higher than control children on these measures.
- The effect size for parent supportiveness in parent-child semistructured play became slightly smaller, and the statistical significance dropped to the .10 level (Table D.8C).
- The effect sizes for several "discipline strategy" variables became somewhat larger, and many became significant at the .05 and .01 levels (Tables D.8E and D.8F). This reinforces the pattern shown in the interim report, which showed that Early Head Start parents were more likely to suggest mild discipline and less likely to suggest severe discipline strategies.

2. Early Head Start Program Impacts by Program Approach

Tables D.8I through D.8L show the results of the analyses by program approach. Once again, there were no major differences compared with the results reported in the interim report. Some of the smaller changes are:

- Some effect sizes for child cognitive outcomes (the Bayley MDI and MacArthur vocabulary and sentence complexity) became slightly larger and more statistically significant. The impact of Early Head Start on these cognitive and language development measures was still found largely in center-based and mixed-approach programs (Table D.8I).

- Early Head Start programs had positive impacts on a number of child language and social-emotional development outcomes in home-based and mixed-approach programs, just as reported in the interim report (Table D.8I).
- In this reanalysis, Early Head Start programs still showed positive impacts on many parenting behaviors in home-based and mixed-approach programs (Table D.8J). The positive impacts on the HOME language environment and the reduction of parent detachment both were slightly more robust with the full sample (statistical significance rises to the .05 level) in the home-based programs.
- There were minor changes in the statistical significance of the impact of Early Head Start on parenting behavior in mixed-approach programs, but effect sizes remained the same (Table D.8J).
- The impact of Early Head Start on suggesting mild discipline strategies in center-based programs became larger and statistically significant at the .05 level. The impact on knowledge of infant development in home-based programs also became more robust (Table D.8K).
- There were generally no changes in the magnitude of Early Head Start impacts on family health and functioning. However, the reduction in parental distress and family conflict in home-based programs became significant at the .10 level (Table D.8L).

3. Early Head Start Program Impacts by Programs' Implementation Pattern

Tables D.8M through D.8P show the results of the analyses by the implementation pattern of programs. Once again, there were no major changes from the results reported in the interim report. Some of the smaller changes were:

- The only change in child cognitive and language development was that the impact on the MacArthur combining word score became more robust, increasing to the .05 level for early implemented programs (Table D.8M).
- The most notable change in child social-emotional development was the negative impact of the Bayley Emotional Regulation measure; it became statistically significant at the .05 level for incompletely implemented programs (Table D.8M).
- There were no notable changes in the magnitude of the impacts of Early Head Start on parenting behavior, although some impacts became slightly more and some slightly less robust (Table D.8N).

TABLE D.8A

IMPACTS ON COGNITIVE AND LANGUAGE DEVELOPMENT

Outcome	Program Group Participants[a]	Control Group[b]	Estimated Impact Per Participant[c]	Effect Size[d]
Cognitive Development				
Bayley Mental Development Index (MDI)	90.1	88.0	2.1***	15.6
Percent with Bayley MDI Below 100	75.2	79.7	-4.5**	-11.0
Percent with Bayley MDI Below 85	33.8	40.8	-6.9***	-14.2
Language Development				
MacArthur Communicative Development Inventory (CDI): Vocabulary Production Score	56.5	53.9	2.6**	11.7
MacArthur CDI: Percent Combining Words	81.0	77.9	3.1*	7.5
MacArthur CDI: Sentence Complexity Score	8.8	7.7	1.1**	13.4
Sample Size				
Parent Interview	**1,118**	**1,048**	**2,166**	
Bayley	**931**	**850**	**1,781**	

SOURCE: Parent interview and child assessments conducted when children were approximately 24 months old.

NOTE: All impact estimates were calculated using regression models, where each site was weighted equally.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities.

[b] The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean was estimated as the difference between the program group mean for participants and the impact per participant.

[c] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for all program and control group members.

[d] The effect size was calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact expressed as a percentage of the standard deviation).

*Significantly different from zero at the .10 level, two-tailed test

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

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TABLE D.8B

IMPACTS ON SOCIAL-EMOTIONAL DEVELOPMENT FOR THE FULL SAMPLE

Outcome	Program Group Participants[a]	Control Group[b]	Estimated Impact Per Participant[c]	Effect Size[d]
Parent-Child Structured Play: Engagement of Parent[e]	4.3	4.2	0.1*	8.7
Parent-Child Structured Play: Negativity toward Parent[e]	1.7	1.8	-0.1	-7.1
Parent-Child Structured Play: Sustained Attention with Objects[e]	5.0	5.0	0.1	7.1
Bayley Behavior Rating Scale (BRS): Emotional Regulation in a Cognitive Task (average score)[f]	3.6	3.6	-0.0	-1.6
Bayley Behavior Rating Scale (BRS): Orientation/ Engagement in a Cognitive Task (average score)[f]	3.7	3.7	0.0	0.0
Child Behavior Checklist: Aggressive Behavior Problems (average score)	9.9	10.4	-0.5*	-9.0
Sample Size	**1,118**	**1,048**	**2,166**	

SOURCE: Parent interviews, child assessments, interviewer observations, and assessments of semi-structured parent-child interactions conducted when children were approximately 24 months old.

NOTE: All impact estimates were calculated using regression models, where each site was weighted equally.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities.

[b] The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean was estimated as the difference between the program group mean for participants and the impact per participant.

[c] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for all program and control group members.

[d] The effect size was calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact expressed as a percentage of the standard deviation).

[e] Behaviors are observed during the videotaped Parent-Child Structured Play task and coded on a seven-point scale.

[f] Behaviors are observed during the Bayley assessment and rated on a five-point scale by the Interviewer/Assessor.

*Significantly different from zero at the .10 level, two-tailed test

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

TABLE D.8C

IMPACTS ON EMOTIONAL SUPPORT

Outcome	Program Group Participants[a]	Control Group[b]	Estimated Impact Per Participant[c]	Effect Size[d]
Home Observation for Measurement of the Environment (HOME): Emotional Responsivity[e]	6.2	6.1	0.1*	8.6
Parent-Child Structured Play: Supportiveness[f]	4.1	4.0	0.1*	8.9
Sample Size				
Parent Interview	**1,118**	**1,048**	**2,166**	
Parent-Child Interactions	**941**	**855**	**1,796**	

SOURCE: Parent interviews and assessments of semi-structured parent-child interactions conducted when children were approximately 24 months old.

NOTE: All impact estimates were calculated using regression models, where each site was weighted equally.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities.

[b] The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean was estimated as the difference between the program group mean for participants and the impact per participant.

[c] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for all program and control group members.

[d] The effect size was calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact expressed as a percentage of the standard deviation).

[e] Behaviors are observed during the HOME assessment and rated on a yes/no scale by the Interviewer/Assessor.

[f] Behaviors are observed during the videotaped parent-child structured play task and coded on a seven-point scale.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE D.8D

IMPACTS ON THE HOME ENVIRONMENT AND STIMULATION OF LANGUAGE AND LEARNING

Outcome	Program Group Participants[a]	Control Group[b]	Estimated Impact Per Participant[c]	Effect Size[d]
Home Observation for Measurement of the Environment (HOME) – Total Score	26.5	26.1	0.4***	11.1
Structuring the Environment				
HOME: Support of Cognitive, Language, and Literacy Environment	10.3	10.1	0.2***	12.7
Percentage of Parents Who Set a Regular Bedtime for Child	61.5	55.6	5.8**	11.6
Percentage of Parents and Children Who Have Regular Bedtime Routines	68.8	66.6	2.3	4.8
Parent-Child Activities				
Parent-Child Activities	4.6	4.5	0.1**	10.6
Percentage of Parents Who Read to Child Every Day	58.0	52.0	5.9**	11.9
Percentage of Parents Who Read to Child at Bedtime	29.0	22.5	6.5***	15.3
Parent's Verbal-Social Skills				
HOME: Maternal Verbal-Social Skills[e]	2.8	2.7	0.0	6.5
Sample Size				
Parent Interview	**1,118**	**1,048**	**2,166**	
Parent-Child Interactions	**941**	**855**	**1,796**	

SOURCE: Parent interviews, interviewer observations, and assessments of semi-structured parent-child interactions conducted when children were approximately 24 months old.

NOTE: All impact estimates were calculated using regression models, where each site was weighted equally.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities.

[b] The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean was estimated as the difference between the program group mean for participants and the impact per participant.

[c] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for all program and control group members.

[d] The effect size was calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact expressed as a percentage of the standard deviation).

[e] Behaviors are observed during the HOME assessment and rated on a yes/no scale by the Interviewer/Assessor.

*Significantly different from zero at the .10 level, two-tailed test

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

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TABLE D.8E

IMPACTS ON NEGATIVE PARENTING BEHAVIOR IN STRUCTURED PLAY AND INTERACTION

Outcome	Program Group Participants[a]	Control Group[b]	Estimated Impact Per Participant[c]	Effect Size[d]
Insensitivity				
Parent-Child Structured Play: Detachment[e]	1.4	1.5	-0.1**	-10.2
Parent-Child Structured Play: Intrusiveness[e]	1.9	1.9	0.0	-4.3
Hostility and Punishment				
Parent-Child Structured Play: Negative Regard[e]	1.5	1.5	0.0	1.8
Home Observation for Measurement of the Environment (HOME): Absence of Punitive Interactions[f]	4.4	4.4	-0.1	-4.0
Percentage of Parents who Spanked the Child in the Previous Week	47.2	52.8	-5.6**	-11.2
Sample Size				
Parent Interview	**1,118**	**1,048**	**2,168**	
Parent-Child Interactions	**941**	**855**	**1,796**	

SOURCE: Parent interviews, interviewer observations, and assessments of semi-structured parent-child interactions conducted when children were approximately 24 months old.

NOTE: All impact estimates were calculated using regression models, where each site was weighted equally.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities.

[b] The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean was estimated as the difference between the program group mean for participants and the impact per participant.

[c] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for all program and control group members.

[d] The effect size was calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact expressed as a percentage of the standard deviation).

[e] Behaviors are observed during the videotaped parent-child structured play task and coded on a seven-point scale.

[f] Behaviors are observed during the HOME assessment and rated on a yes/no scale by the Interviewer/Assessor.

*Significantly different from zero at the .10 level, two-tailed test
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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TABLE D.8F

IMPACTS ON PARENTING KNOWLEDGE: CHILD DEVELOPMENT AND DISCIPLINE STRATEGIES

Outcome	Program Group Participants[a]	Control Group[b]	Estimated Impact Per Participant[c]	Effect Size[d]
Knowledge o Child Development				
Knowledge of Infant Development Inventory (KIDI)	3.4	3.3	0.1***	12.7
Discipline Strategies				
Percentage of Parents Who Suggested Responses to Hypothetical Situations with Child:				
Prevent or Distract	72.8	67.4	5.5**	11.7
Remove Child or Object	80.4	81.7	-1.4	-3.5
Talk and Explain	37.8	31.1	6.7***	14.3
Threaten or Command	32.1	34.3	-2.2	-4.6
Shout	5.8	5.1	0.7	3.4
Physical Punishment	27.1	30.5	-3.4*	-7.4
Percentage of Parents Suggesting Only Mild Responses to the Hypothetical Situations[e]	43.1	38.2	4.9**	10.0
Index of Severity of Discipline Strategies Suggested[f]	2.7	2.8	-0.2**	-9.0
Sample Size	**1,118**	**1,048**	**2,166**	

SOURCE: Parent interviews conducted when children were approximately 24 months old.

NOTE: All impact estimates were calculated using regression models, where each site was weighted equally.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities.

[b] The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean was estimated as the difference between the program group mean for participants and the impact per participant.

[c] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for all program and control group members.

[d] The effect size was calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact expressed as a percentage of the standard deviation).

[e] Parents were classified as suggesting only mild discipline if their responses to the three discipline situations include only the following: prevent or distract, remove child or object, or talk and explain.

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TABLE D.8F *(continued)*

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[c] The Index of Severity of Discipline Strategies is based on a hierarchy of discipline practices from talk and explain or prevent/distract (1) through physical punishment (5). The most severe approach suggested is used to code this scale.

*Significantly different from zero at the .10 level, two-tailed test

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

TABLE D.8G

IMPACTS ON SAFETY PRACTICES
(Percentages)

Outcome	Program Group Participants[a]	Control Group[b]	Estimated Impact Per Participant[c]	Effect Size[d]
Family Has Syrup of Ipecac in the House in Case of a Poison Emergency	29.9	29.6	0.3	0.6
Parent/Guardian Has or Knows How to Find the Telephone Number For the Poison Control Center	38.2	36.0	2.2	4.5
Family Uses a Gate or Door at the Top of Stairs	79.0	80.9	-1.8	-3.8
Family Uses Guards or Gates For Windows	63.0	64.8	-1.8	-3.8
Family Has Covers on Electrical Outlets That Child Can Reach	60.6	60.7	-0.1	-0.2
Family's Homes Has Working Smoke Alarms	87.1	84.8	2.3	6.2
Family Uses a Car Seat For Child and it is in the Back Seat of the Car	80.8	82.0	-1.2	-3.1
Interviewer Observed That Child's Play Area is Safe	69.2	68.8	0.3	0.7
Sample Size	**1,118**	**1,048**	**2,166**	

SOURCE: Parent interviews and interviewer observations conducted when children were approximately 24 months old.

NOTE: All impact estimates were calculated using regression models, where each site was weighted equally.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities.

[b] The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean was estimated as the difference between the program group mean for participants and the impact per participant.

[c] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for all program and control group members.

[d] The effect size was calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact expressed as a percentage of the standard deviation).

*Significantly different from zero at the .10 level, two-tailed test

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

TABLE D.8H

IMPACTS ON PARENT HEALTH AND FAMILY FUNCTIONING

Outcome	Program Group Participants[a]	Control Group[b]	Estimated Impact Per Participant[c]	Effect Size[d]
Parent's Physical Health				
Parent's Health Status	3.5	3.5	0.0	2.7
Parent's Mental Health				
Parental Distress	24.8	26.0	-1.2**	-12.2
Parent-Child Dysfunctional Interaction	16.9	17.4	-0.5*	-8.7
CIDI-Depression–Average Probability	12.1	12.1	0.0	1.0
Family Functioning				
Family Environment Scale–Family Conflict (Average Score)	1.7	1.7	-0.1**	-10.3
Sample Size	**1,118**	**1,048**	**2,166**	

SOURCE: Parent interviews conducted when children were approximately 24 months old.

NOTE: All impact estimates were calculated using regression models, where each site was weighted equally.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities.

[b] The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean was estimated as the difference between the program group mean for participants and the impact per participant.

[c] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for all program and control group members.

[d] The effect size was calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact expressed as a percentage of the standard deviation).

*Significantly different from zero at the .10 level, two-tailed test

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

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TABLE D.8I

IMPACTS ON CHILD OUTCOMES AT AGE 2, BY PROGRAM APPROACH IN 1997

	Center-Based				Home-Based Programs				Mixed-Approach Programs			
Outcome	Program Group	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]
Child Cognitive Development												
Average Bayley Mental Development Index (MDI)	90.1	87.1	3.1**	22.9	91.6	90.4	1.1	8.4	88.2	86.9	1.4	10.1
Percentage with MDI < 85***[d]	31.4	43.6	-12.2*	-25.0	31.4	32.7	-1.3	-2.7	37.9	44.8	-6.9	-14.1
Percentage with MDI < 100	75.4	84.1	-8.2*	-20.1	73.1	72.2	1.0	2.4	77.3	79.8	-2.6	-6.3
Child Language Development												
Average MacArthur CDI—Vocabulary Production	55.0	55.0	-0.0	-0.2	56.5	53.3	3.1*	13.9	57.5	53.4	4.1**	18.3
Percentage with Vocabulary Production < 25***	11.0	12.7	-1.7	-5.2	11.4	11.2	0.3	0.8	5.4	8.4	-3.1	-9.6
Percent MacArthur CDI—Combining Words***	84.1	83.6	0.5	1.2	76.9	75.6	1.2	3.0	83.8	75.3	8.5***	20.2
Average MacArthur CDI—Sentence Complexity*	8.7	8.5	0.2	2.8	8.5	7.7	0.7	9.0	9.2	6.9	2.3***	28.5
Percentage with Sentence Complexity < 2***	29.1	25.7	3.4	7.4	28.7	30.4	-1.8	-3.9	22.7	31.4	-8.7**	-19.0
Child Social-Emotional Development												
Bayley BRS—Emotional Regulation	3.7	3.7	0.1	7.3	3.6	3.6	-0.1	-5.7	3.6	3.7	0.0	-4.9
Bayley BRS—Orientation/Engagement	3.7	3.7	-0.1	-7.7	3.6	3.6	0.0	1.2	3.7	3.7	0.0	-2.9
Child Behavior Checklist—Aggression	9.3	9.9	-0.6	-11.0	10.4	10.5	-0.2	-2.7	9.7	10.6	-0.9*	-16.0
Parent-Child Structured Play: Child Sustained Attention with Objects	5.0	5.1	-0.1	-8.1	5.1	5.0	0.0	4.2	5.1	4.9	0.2*	17.6
Parent-Child Structured Play: Child Negativity Toward Parent	1.8	1.7	0.1	-7.1	1.7	1.7	-0.0	-4.3	1.8	2.0	-0.2*	-18.8
Parent-Child Structured Play: Child Engagement	4.4	4.4	-0.1	-3.9	4.3	4.3	0.0	3.7	4.3	4.0	0.3**	21.5
Sample Size												
Parent Interview	240	203	443		500	466	966		352	352	704	
Bayley	217	181	398		432	387	819		282	282	564	
Parent-Child Interactions	236	195	431		429	374	803		276	286	562	

SOURCE: Parent interviews, child assessments, interviewer observations, and assessments of semi-structured parent-child interactions conducted when children were approximately 24 months old.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

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TABLE D.81 *(continued)*

[a] The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant. A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based services, and/or participated in Early Head Start parent-child group activities.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE D.8J

IMPACTS ON PARENTING BEHAVIOR AT AGE 2, BY PROGRAM APPROACH IN 1997

	Center-Based Programs				Home-Based Programs				Mixed-Approach Programs			
Outcome	Program Group	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]
Quality of the Home Environment and Parenting: Emotional Support												
Home Observation for Measurement of the Environment (HOME) Emotional Responsivity	5.9	5.9	-0.0	-2.4	6.5	6.4	0.1*	9.5	6.0	5.9	0.2	10.6
Parent-Child Structured Play: Parent Supportiveness	4.0	4.0	-0.0	-4.0	4.1	4.0	0.1*	9.3	4.1	3.9	0.2**	19.3
Quality of the Home Environment and Parenting: Stimulation of Language and Learning												
HOME Total Score	26.1	26.2	-0.1	-3.1	26.9	26.4	0.5**	13.2	26.3	25.7	0.6**	17.4
HOME Support of Cognitive, Language, and Literacy Environment*[d]	10.2	10.2	-0.0	-1.6	10.3	10.1	0.2**	10.7	10.4	10.0	0.6***	21.3
Percentage of Parents who set a Regular Bedtime for Child***	65.9	57.6	8.3*	16.8	59.1	54.0	5.2	10.4	59.7	55.0	4.7	9.5
Percentage of Parents and Children Who have Regular Bedtime Routines***	70.1	67.5	2.6	5.5	69.6	65.4	4.2	9.0	66.4	65.9	0.5	1.0
Percentage of Parents Who Read to Child Daily***	56.7	49.2	7.5	15.0	55.8	54.3	1.5	3.1	60.7	48.3	12.4***	24.9
Percentage of Parents Who Read to Child as Part of Bedtime Routine***	29.3	21.1	8.2*	19.5	26.6	19.4	7.2**	17.1	30.0	25.5	4.5	10.7
Reading Frequency**	4.6	4.5	0.1	8.8	4.6	4.6	0.0	-1.1	4.7	4.3	0.4***	28.3
Parent-Child Activities to Stimulate Cognitive and Language Development	4.5	4.5	0.0	5.1	4.6	4.5	0.0	5.0	4.6	4.4	0.2***	23.3
HOME Maternal Verbal/Social Skills	2.7	2.8	-0.1	-8.7	2.9	2.9	0.0	5.1	2.7	2.6	0.1	14.5
Quality of the Home Environment and Parenting: Negative Parenting Behavior												
Parent-Child Structured Play: Parent Detachment	1.4	1.4	0.1	6.8	1.4	1.5	-0.2**	-16.8	1.4	1.5	-0.2*	-16.2
Parent-Child Structured Play: Parent Intrusiveness	2.0	1.9	0.1	12.6	1.8	1.9	-0.1	-9.0	1.9	2.0	-0.2*	-16.1
Parent-Child Structured Play: Negative Regard	1.5	1.4	0.1	9.4	1.4	1.5	-0.1	-5.6	1.4	1.4	0.0	1.8
HOME Absence of Punitive Interactions	4.5	4.5	-0.0	1.7	4.3	4.3	-0.0	-0.7	4.4	4.5	-0.1	-4.9
Spanked Child in Last Week***	52.1	57.0	-5.0	-9.9	48.6	52.5	-3.8	-7.7	43.9	52.2	-8.3**	-16.7
Sample Size												
Parent Interview	**240**	**203**	**443**		**500**	**466**	**966**		**352**	**352**	**704**	
Parent-Child Interactions	**236**	**195**	**431**		**429**	**374**	**803**		**276**	**286**	**562**	

SOURCE: Parent interviews and assessments of parent-child interactions during semi-structured tasks conducted when children were approximately 24 months old.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

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TABLE D.8.J *(continued)*

[a]The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant. A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based services, and/or participated in Early Head Start parent-child group activities.

[b]The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c]The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d]Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE D.8K

IMPACTS ON PARENTING KNOWLEDGE AT AGE 2, BY PROGRAM APPROACH IN 1997

	Center-Based Programs				Home-Based Programs				Mixed-Approach Programs			
Outcome	Program Group	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]
Knowledge o Child Development												
Knowledge of Infant Development Inventory (KIDI)	3.4	3.4	0.0	-0.8	3.4	3.3	0.1***	17.2	3.4	3.4	0.1**	15.4
Discipline Strategies												
Percentage of Parents Who Suggested Responses to Hypothetical Conflicts with Child:												
Prevent or Distract***[d]	72.1	60.2	11.9**	25.5	69.7	66.8	2.9	6.2	77.0	72.3	4.7	9.9
Remove Child or Object***	78.7	83.6	-4.9	-12.7	78.6	80.6	-2.0	-5.1	83.4	82.3	1.1	2.4
Talk and Explain***	30.1	31.4	-1.3	-2.9	34.3	27.9	6.4**	13.7	47.7	32.6	15.0***	32.2
Threaten or Command***	34.9	49.1	-14.2**	-30.2	29.0	28.2	0.8	1.6	33.1	30.3	2.8	5.9
Shout***	5.8	6.5	-0.7	-3.2	5.9	4.0	1.9	8.8	5.8	4.5	1.2	5.7
Physical Punishment***	37.2	33.7	3.4	7.5	22.9	26.0	-3.1	-6.8	25.2	32.3	-7.1*	-15.4
Percentage of Parents Suggesting Only Mild Responses to the Hypothetical Conflicts***	36.7	26.0	10.7**	21.8	48.0	44.8	3.2	6.6	41.9	39.5	2.4	5.0
Index of Discipline Severity	3.0	3.1	-0.1	-8.1	2.5	2.6	-0.1	-6.6	2.6	2.8	-0.2	-10.4
Safety Practices												
Has Syrup of Ipecac at Home***	19.0	22.5	-3.5	-7.5	30.6	30.7	-0.1	-0.2	35.5	32.5	3.0	6.6
Has Poison Control Number***	34.2	36.0	-1.8	-3.7	36.7	36.6	0.1	0.1	42.5	36.2	6.3	13.0
Has Gates or Doors in Front of Stairs***	84.9	90.0	-5.1	-12.9	72.8	75.4	-2.6	-6.6	82.1	80.2	2.0	5.0
Uses Guards or Gates for Windows***	81.0	86.3	-5.4	-11.3	52.6	55.4	-2.8	-5.8	62.5	63.0	-0.5	-1.1
Covers Electric Outlets***	51.1	78.4	-19.8***	-40.3	61.0	57.2	3.5	7.2	65.9	60.1	5.9	11.9
Home has Working Smoke Alarm***	89.4	83.4	6.3	17.4	83.5	83.4	0.1	0.3	89.9	86.5	3.4	9.3
Uses a Car Seat***	75.6	81.8	-5.3	-16.5	81.3	80.8	0.5	1.3	83.9	84.5	-0.6	-1.5
Observed Child Play Area is Safe***	53.6	57.7	-4.2	-8.9	74.6	74.3	0.4	0.8	73.3	71.7	1.6	3.4
Sample Size	256	222	478		505	467	972		353	353	706	

SOURCE: Parent interviews and assessments of parent-child interactions conducted when children were approximately 24 months old.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant. A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based services, and/or participated in Early Head Start parent-child group activities.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

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TABLE D.8K *(continued)*

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE D.8L

IMPACTS ON PARENT HEALTH AND FAMILY FUNCTIONING AT AGE 2, BY PROGRAM APPROACH IN 1997

	Center-Based Programs				Home-Based Programs				Mixed-Approach Programs			
Outcome	Program Group Participants[a]	Control Group[b]	Impact Estimate Per Participant[c]	Effect Size[d]	Program Group Participants[a]	Control Group[b]	Impact Estimate Per Participant[c]	Effect Size[d]	Program Group Participnts[a]	Control Group[b]	Impact Estimate Per Participant[c]	Effect Size[d]
Parent's Physical Health												
Overall Health Status	3.5	3.6	-0.1	-12.3	3.4	3.4	0.0	1.6	3.6	3.5	0.1	5.3
Parent's Mental Health												
Parenting Stress Index: Parental Distress	24.7	24.8	-0.1	-1.1	25.0	26.2	-1.1*	-13.8	24.7	26.9	-2.2***	-23.1
Parenting Stress Index: Parent-Child Dysfunctional Interaction	16.5	17.4	-0.8	-13.5	17.0	17.6	-0.6	-9.0	17.0	17.5	-0.5	-7.5
Composite International Diagnostic Interview (CIDI) Short Screening Scales: Major Depression (probability)	9.6	9.1	0.5	1.6	14.5	11.9	2.6	8.7	11.4	12.5	-1.0	-3.5
Family Functioning												
FES Family Conflict	1.7	1.7	0.0	-2.3	1.7	1.7	-0.1*	-13.6	1.7	1.7	0.0	-7.8
Sample Size	**256**	**222**	**478**		**507**	**467**	**972**		**353**	**353**	**706**	

SOURCE: Parent interviews, child assessments, and videotaped interactions conducted when children were approximately 24 months old.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities.

[b] The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant. A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based services, and/or participated in Early Head Start parent-child group activities.

[c] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[d] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[e] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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TABLE D.8M

IMPACTS ON CHILD OUTCOMES AT AGE 2, BY PATTERN OF IMPLEMENTATION

	Early Implementers				Later Implementers				Incomplete Implementers			
Outcome	Program Group	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]
Child Cognitive Development												
Average Bayley Mental Development Index (MDI)	91.9	89.7	2.2*	16.2	86.3	84.1	2.2*	15.9	92.3	91.4	1.0	7.2
Percentage with MDI < 85***[d]	29.5	36.0	-6.5	-13.2	44.7	51.5	-6.9	-14.0	26.5	31.7	-5.1	-10.6
Percentage with MDI < 100***	67.7	72.3	-4.6	-11.2	84.3	90.8	-6.5**	-15.8	73.7	70.4	3.3	8.0
Child Language Development												
Average MacArthur CDI—Vocabulary Production	59.8	55.6	4.2**	18.6	52.9	51.7	1.2	5.4	56.8	54.1	2.7	11.9
Percentage with Vocabulary Production < 25***	7.5	8.8	-1.3	-4.0	12.1	13.9	-1.7	-5.4	8.0	9.5	-1.5	-4.7
Percent MacArthur CDI—Combining Words***	86.1	79.8	6.2**	14.9	71.7	70.5	1.2	2.8	86.6	84.8	1.8	4.4
Average MacArthur CDI—Sentence Complexity	9.9	8.3	1.6**	20.0	7.4	6.4	1.0	17.8	9.0	8.4	0.6	7.5
Percentage with Sentence Complexity < 2***	22.8	25.8	-3.0	-6.6	36.0	37.4	-1.4	-3.1	19.5	23.5	-4.0	-8.8
Child Social-Emotional Development												
Bayley BRS—Emotional Regulation*	3.8	3.7	0.1*	15.5	3.6	3.6	0.0	-1.4	3.5	3.6	-0.2**	-21.7
Bayley BRS—Orientation/Engagement	3.9	3.9	0.0	0.9	3.5	3.4	0.0	3.5	3.6	3.7	-0.1	-9.3
Child Behavior Checklist—Aggression	9.4	10.6	-1.2***	-22.2	10.5	10.5	-0.1	-0.9	9.7	10.2	-0.4	-7.9
Parent-Child Structured Play: Child Sustained Attention with Objects	5.2	5.0	0.2**	20.3	5.0	4.9	0.1	12.3	4.9	5.0	-0.1	-9.0
Parent-Child Structured Play: Child Negativity Toward Parent	1.6	1.8	-0.1*	-14.7	1.7	1.8	-0.1	-6.0	1.9	1.9	0.1	6.4
Parent-Child Structured Play: Child Engagement**	4.6	4.4	0.2**	19.1	4.3	4.1	0.2*	14.4	4.1	4.2	-0.2	-13.1
Sample Size												
Parent Interview	381	352	733		417	391	808		294	278	572	
Bayley	332	303	635		333	292	625		266	255	521	
Parent-Child Interactions	324	302	626		366	321	687		251	232	483	

SOURCE: Parent interviews, child assessments, interviewer observations, and assessments of semi-structured parent-child interactions conducted when children were approximately 24 months old.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

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TABLE D.8M *(continued)*

[a] The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant. A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based services, and/or participated in Early Head Start parent-child group activities.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE D.8N

IMPACTS ON PARENTING BEHAVIOR AT AGE 2, BY PATTERN OF IMPLEMENTATION

	Early Implementers				Later Implementers				Incomplete Implementers			
Outcome	Program Group	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]
Quality of the Home Environment and Parenting: Emotional Support												
Home Observation for Measurement of the Environment (HOME) Emotional Responsivity	6.1	5.9	0.2	10.8	6.2	6.1	0.0	2.0	6.4	6.3	0.1	4.4
Parent-Child Structured Play: Parent Supportiveness	4.5	4.3	0.2**	18.6	3.9	3.8	0.1	7.1	3.8	3.9	-0.1	-7.5
Quality of the Home Environment and Parenting: Stimulation of Language and Learning												
HOME Total Score	27.1	26.5	0.7***	17.4	25.6	25.5	0.1	3.4	26.9	26.6	0.2	6.5
HOME Support of Cognitive, Language, and Literacy Environment	10.8	10.4	0.4***	20.5	9.8	9.7	0.0	1.4	10.5	10.2	0.2*	13.3
Percentage of Parents who set a Regular Bedtime for Child***[d]	66.1	60.8	5.4	10.8	55.7	50.5	5.2	6.5	62.8	57.2	5.6	11.3
Percentage of Parents and Children Who have Regular Bedtime Routines***	73.9	69.3	4.6	9.9	61.4	63.9	-2.6	-5.5	71.9	65.7	6.2	13.2
Percentage of Parents Who Read to Child Daily***	63.0	49.7	13.4***	26.7	49.7	45.7	4.0	8.1	62.3	59.0	3.2	6.5
Percentage of Parents Who Read to Child as Part of Bedtime Routine***	34.7	27.3	7.3*	17.4	19.0	15.5	3.5	8.3	35.1	21.2	13.9***	33.1
Reading Frequency*	4.8	4.5	0.3***	27.8	4.4	4.3	0.1	3.9	4.7	4.7	0.0	1.8
Parent-Child Activities to Stimulate Cognitive and Language Development	4.6	4.4	0.2***	20.2	4.5	44	0.1	9.1	4.6	4.6	0.0	0.2
HOME Maternal Verbal/Social Skills	2.8	2.7	0.1*	13.0	2.7	2.7	0.0	0.2	2.9	2.9	0.0	-1.3
Quality of the Home Environment and Parenting: Negative Parenting Behavior												
Parent-Child Structured Play: Parent Detachment	1.3	1.4	-0.1*	-12.7	1.4	1.6	-0.2**	-19.3	1.5	1.5	0.0	-4.2
Parent-Child Structured Play: Parent Intrusiveness	1.7	1.8	-0.1	-7.0	1.9	1.9	-0.1	-6.6	2.2	2.2	0.0	-1.9
Parent-Child Structured Play: Negative Regard	1.3	1.4	0.0	-3.3	1.5	1.4	0.0	1.3	1.6	1.6	0.0	5.1
HOME Absence of Punitive Interactions	4.5	4.5	0.0	0.6	4.3	4.4	-0.1	-4.9	4.2	4.3	-0.1	-7.1
Spanked Child in Last Week***	43.8	51.8	-8.0**	-16.1	49.5	55.4	-5.9	-11.8	47.6	54.9	-7.3	-14.6
Sample Size												
Parent Interview	**381**	**352**	**733**		**417**	**391**	**808**		**294**	**278**	**572**	
Parent-Child Interactions	**324**	**302**	**626**		**366**	**321**	**687**		**251**	**232**	**483**	

SOURCE: Parent interviews, child assessments, interviewer observations, and assessments of parent-child interactions during semi-structured tasks conducted when children were approximately 24 months old.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

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TABLE D.8N *(continued)*

[a] The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant. A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based services, and/or participated in Early Head Start parent-child group activities.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE D.8O

IMPACTS ON PARENTING KNOWLEDGE AT AGE 2, BY PATTERN OF IMPLEMENTATION

	Early Implementers				Later Implementers				Incomplete Implementers			
Outcome	Program Group	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]	Program Group	Control Group[a]	Impact Estimate Per Participant[b]	Effect Size[c]
Knowledge of Child Development												
Knowledge of Infant Development Inventory (KIDI)	3.5	3.4	0.0	6.6	3.3	3.2	0.1***	20.2	3.4	3.4	0.0	8.5
Discipline Strategies												
Percentage of Parents Who Suggested Responses to Hypothetical Conflicts with Child:												
Prevent or Distract***[d]	74.8	63.5	11.3***	24.2	73.9	69.5	4.4	9.4	69.2	68.5	0.7	1.4
Remove Child or Object***	84.8	85.4	-0.7	-1.7	81.4	84.6	-3.2	-8.3	73.9	74.5	-0.7	-1.7
Talk and Explain***	41.4	30.4	10.9***	23.4	39.7	32.4	7.4*	15.7	31.6	28.2	3.4	7.3
Threaten or Command***	31.3	38.6	-7.3*	-15.5	38.2	38.7	-0.5	-1.1	25.8	23.3	2.5	5.3
Shout***	5.6	3.9	1.7	7.8	4.7	5.2	-0.5	-2.2	6.7	6.7	0.1	0.1
Physical Punishment***	15.9	23.6	-7.7**	-16.7	32.9	35.5	-2.6	-5.7	33.1	33.7	-0.5	-1.2
Percentage of Parents Suggesting Only Mild Responses to the Hypothetical Conflicts***	49.6	40.7	8.9**	18.2	37.1	35.0	2.1	4.3	42.4	39.9	2.5	5.1
Index of Discipline Severity	2.3	2.6	-0.3**	-17.6	2.9	3.0	-0.1	-4.9	2.8	2.8	-0.1	3.8
Safety Practices												
Has Syrup of Ipecac at Home***	41.1	38.1	3.1	6.7	15.2	17.6	-2.5	-5.4	33.9	35.3	-1.4	-3.1
Has Poison Control Number***	47.7	43.9	3.9	8.0	24.5	23.4	1.1	2.3	43.0	39.5	3.5	7.3
Has Gates or Doors in Front of Stairs***	77.8	77.0	0.9	2.2	83.9	87.4	-3.4	-8.8	73.9	77.8	-3.9	-10.0
Uses Guards or Gates for Windows***	64.0	67.4	-3.4	-7.0	76.5	73.6	2.9	6.1	44.9	53.9	-9.0*	-18.7
Covers Electric Outlets***	62.0	60.3	1.7	3.5	57.3	57.0	0.3	0.7	62.5	62.5	0.0	0.0
Home has Working Smoke Alarm***	87.8	84.2	3.6	9.9	84.4	82.0	2.4	6.6	89.5	89.6	-0.1	-0.3
Uses a Car Seat***	82.7	82.7	0.1	0.1	83.8	83.0	0.7	1.9	74.7	79.7	-5.0	-13.2
Observed Child Play Area is Safe***	67.0	63.7	3.2	7.0	64.0	66.4	-2.3	-5.0	77.7	76.4	1.2	2.6
Sample Size	**381**	**352**	**733**		**417**	**391**	**808**		**294**	**278**	**572**	

SOURCE: Parent interviews conducted when children were approximately 24 months old.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant. A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based services, and/or participated in Early Head Start parent-child group activities.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

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TABLE D.8O *(continued)*

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE D.8P

IMPACTS ON PARENT HEALTH AND FAMILY FUNCTIONING AT AGE 2, BY PATTERN OF IMPLEMENTATION

	Early Implementers				Late Implementers				Incomplete Implementers			
Outcome	Program Group Participants[a]	Control Group[b]	Impact Estimate Per Participant[c]	Effect Size[d]	Program Group Participants[a]	Control Group[b]	Impact Estimate Per Participant[c]	Effect Size[d]	Program Group Participnts[a]	Control Group[b]	Impact Estimate Per Participant[c]	Effect Size[d]
Parent's Physical Health												
Overall Health Status	3.5	3.4	0.1	9.8	3.4	3.4	0.1	5.5	3.5	3.6	-0.1	-7.4
Parent's Mental Health												
Parenting Stress Index: Parental Distress	24.2	25.7	-1.5**	-15.4	25.7	27.4	-1.7**	-17.4	24.5	25.1	-0.6	-5.9
Parenting Stress Index: Parent-Child Dysfunctional Interaction	16.9	17.1	-0.2	-3.1	17.7	18.1	-0.4	-6.3	16.0	17.1	-1.1**	-17.4
Composite International Diagnostic Interview (CIDI) Short Screening Scales: Major Depression (lower bound)	12.2	16.9	-4.7*	-15.6	13.2	9.8	3.4	11.4	10.3	10.8	-0.5	-1.7
Family Functioning												
FES Family Conflict	1.7	1.7	-0.1	-12.8	1.7	1.8	0.0	-4.6	1.6	1.7	-0.1	-16.0
Sample Size	**381**	**352**	**733**		**417**	**391**	**808**		**294**	**278**	**572**	

SOURCE: Parent interviews, child assessments, and videotaped interactions conducted when children were approximately 24 months old.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities.

[b] The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant. A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based services, and/or participated in Early Head Start parent-child group activities.

[c] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[d] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[e] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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D.9 ANALYSES OF PARENTING OUTCOMES AT 24 MONTHS AS MEDIATORS OF CHILD OUTCOMES AT 36 MONTHS

Early Head Start programs seek to influence children's well-being by providing center-based and/or home-based child development services directly to children and by providing services to support and inform parents. Programs thus intervene to enhance children's development both through direct services to the child and indirectly, through changes in parenting practices and behavior. Therefore, we would expect that changes in parenting behavior brought about by Early Head Start would, in concert with direct services from the program, help influence children's outcomes in the future.

We conducted analyses to explore the relationships between Early Head Start impacts on parenting outcomes at 24 months and program impacts on children a year later. In this appendix, we describe the models and summarize the results.

A. MODELS OF PARENTING INFLUENCES ON CHILD OUTCOMES

At 36 months, Early Head Start had favorable impacts on children's cognitive and language development and on some aspects of social-emotional behavior. In particular, 3-year-old children enrolled in Early Head Start had higher Bayley MDI scores, higher PPVT-III scores, higher levels of engagement with the parent and sustained attention with objects during semistructured play; and lower levels of negativity toward the parent during semistructured play and lower levels of aggressive behavior.

Theories of child development suggest that these favorable outcomes for children may be partly attributable to the program's impacts on parents at an early point. For example, previous research has shown that children's language development is related to the amount and variety of language they are exposed to by caregivers, so we would expect that earlier impacts on support for the cognitive, language, and literacy environment of the home and regular reading to the child could contribute to children's language gains later on. Similarly, previous research indicates that children's aggressive behavior is related to experiences of punitive parenting practices, so we would expect that the program's success at reducing the incidence of physical punishment at 24 months could contribute to reductions in aggressive behavior later on.

At 24 months, Early Head Start had favorable impacts on several important aspects of parenting, including emotionally supportive parenting, support for language and cognitive development, parenting knowledge, insensitivity, and punitive behavior. To explore whether the pattern of Early Head Start program impacts on children at 36 months is consistent with developmental theory and program theories of change that suggest a relationship between earlier impacts on parenting behavior and future impacts on children, we conducted analyses of the association between impacts on child outcomes at 36 months and impacts on related parenting behavior at 24 months. In choosing parenting mediators for each child outcome, we have tried to identify one parenting mediator to represent a distinct aspect of parenting behavior such as emotionally supportive parenting, rather than using several variables from a single domain that may provide overlapping information.

For child cognitive and language impacts, we estimated their association with parenting practices that theory suggests would promote cognitive and language development. Thus, we included in these models supportiveness during semistructured play at 24 months, which is based on observations of parent-child play and indicates the extent to which parents responded to the child's cues, showed sensitivity and positive regard for the child, and attempted to extend the play by providing language stimulation and learning opportunities. We included the support for cognitive, language, and literacy environment subscale of the HOME at 24 months because it measures materials in the child's environment and parenting behavior with the child that provide cognitive and language stimulation (for example, the availability of a variety of toys to simulate development and frequent reading to the child). We also included whether the parent reads to the child every day at 24 months. The three variables give us an observer's rating of the parent's responsiveness and cognitive stimulation of the child, a measure of the stimulating materials in the child's environment, and a measure of the parent's reading within the structure of the day.

For positive aspects of children's social-emotional behavior during semistructured play, we estimated their association with parenting practices that theory suggests would strengthen the child's engagement of the parent and curiosity and attentiveness to a task (sustained attention). Thus, the model for engagement of parent includes variables measuring warm and supportive behavior, cognitive stimulation, and insensitivity, which together are expected to influence the child's positive relationship with the parent. We included warm sensitivity during parent-child semistructured play at 24 months, or the extent to which the parent responded to the child's cues and showed sensitivity and positive regard for the child.[14] It also includes the emotional responsivity subscale of the HOME at 24 months, which measures the parent's responsiveness to the child based on observations by the home interviewer. We included the support for cognitive, language, and literacy environment subscale of the HOME at 24 months because it measures parent activities to stimulate learning in part through play and reading, which are expected to strengthen the parent-child relationship. We included detachment during semistructured play at 24 months, or the extent to which the parent is inattentive to the child, inconsistently attentive, or interacts with the child in an indifferent manner, because detached parenting may dampen the child's interest in trying to engage the parent in play.

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[14] Warm sensitivity is a composite of two out of three variables that comprised the measure of Supportiveness. Warm sensitivity includes Positive Regard and Sensitivity, but omits Cognitive Stimulation; all three of the variables are averaged to create the Supportiveness measure.

The model for children's sustained attention toward objects includes a similar set of parenting variables, but with somewhat more emphasis on cognitive stimulation along with emotional support. Thus, in addition to the HOME support for cognitive, language, and literacy environment subscale at 24 months, we also include supportiveness during semistructured play at 24 months. We include knowledge of infant development because parents who are more knowledgeable are expected to provide the emotional support and cognitive stimulation that can enhance the child's curiosity and attention to a task. We include parental distress because parents who are distressed in their parenting role may be less able to provide the emotional support and cognitive stimulation needed to enhance children's attention to play tasks.

For negative aspects of children's social-emotional development, we included emotionally supportive parenting behavior, punitive behavior, parental distress, and insensitivity (for child negativity) and structuring the day (for aggressive behavior). For negativity toward the parent in play, we included warm sensitivity during semistructured play at 24 months, or the parent's responsiveness and warmth toward the child during semistructured play, because we expect children to show less negativity toward a parent who is more warm and sensitive during play. We included physical punishment in the past week at 24 months because we expect use of physical punishment to increase child negativity toward the parent. We included parental distress because stress and depression in the parenting role is likely to be detrimental to the parent-child relationship and thus increase child negativity toward the parent. We included intrusiveness during semistructured play at 24 months, or the extent to which the parent controlled the pace and direction of play, grabbed toys from the child, or did not take turns or consider the child's perspective in play. Such parenting behavior could provoke child negativity toward the parent.

Our model for child aggressive behavior includes warm sensitivity, physical punishment in the past week, and parental distress, all measured when the child was 24 months old, because lower levels of emotional support, and higher levels of punitiveness or stress and depression in the parenting role are expected to increase the child's level of aggressive behavior. In addition, we included whether the child had a regular bedtime at 24 months because parents who keep the child on a bedtime schedule may help ensure that the child feels rested and secure, which may tend to reduce aggressive behavior.

B. APPROACH TO ESTIMATION

The approach to the mediated analysis can be thought of as having three stages. In the first stage, the child outcome at 36 months is regressed on the 24-month parenting mediators and other explanatory variables that were not changed by the program, such as the parent's age, ethnicity, and other characteristics at enrollment (moderators). In the second stage, the regression coefficient on each mediator is multiplied by the Early Head Start impact on that mediator. These products are what we would expect the program impacts on the child outcome to be on the basis of the estimated relationship between the parenting mediators and the child outcome (in other words, what the program impact on the child is expected to be if all of the program's influence came through the earlier impacts on parenting). We label these products the "implied" impacts. Finally, the *implied* impacts are compared to the *actual* impact on the child outcome. These results indicate the extent to which impacts on the child outcome variable can be partitioned into impacts attributable to each parenting mediator.

Formally, we conducted the mediated analysis by first estimating the following regression model:

$$(1)\quad y = \alpha_0 + \alpha_1 T + \sum_i M_i \gamma_i + X\beta + \varepsilon,$$

where y is a child outcome at 36 months, T is an indicator variable equal to 1 for program group members, M_i is a mediating parenting variable at 24 months, X are explanatory variables (moderators), ε is a mean zero disturbance term, and the other Greek letters are parameters to be estimated. The estimated parameters from this model were then used to partition the *impact* on y (denoted by I_y) as follows:

$$(2)\quad I_y = \hat{\alpha}_1 + \sum_i I_{M_i} \hat{\gamma}_i,$$

where I_{Mi} is the impact on the mediator.

In this formulation, the parameter, γ_i, represents the marginal effect of a particular mediator on the outcome measure, holding constant the effects of the other mediators and moderators. For example, it represents the change in the longer-term outcome measure if the value of the mediator were increased by one unit, all else equal. Thus, the impact of Early Head Start on the longer-term outcome in equation (1) can be decomposed into two parts: one due to the mediators (the "implied" impacts) and the second due to residual factors (represented by the parameter α_1). Our analysis focuses on the part due to the mediators and the extent to which these implied impacts account for the impact on the longer-term outcome.

While the mediated analyses allow us to estimate relationships among variables that developmental theory predicts are related, these models are not structural models, and therefore cannot measure causal relations between parent and child measures. Structural analyses of parent behavior and child development are very difficult to conduct because of the complex relationships among various measures of the parent's mental health and parenting behavior and simultaneity problems that lead to bias in the estimated relationships between parent and child outcomes. Therefore, the goal of these analyses is more modest than establishing a measured causal link between parenting impacts and child impacts. Instead, the goal is best viewed as establishing whether there are associations between the parenting and child impacts that are consistent with theories of change. We cannot measure the individual parameters reliably, but the patterns of association are likely to indicate that causal relations exists. In particular, these analyses are designed to provide some plausible support for or raise questions about programs' theories of change that suggest programs have an impact on children through earlier impacts on parenting behavior.

C. RESULTS OF THE MEDIATED ANALYSES FOR THE FULL SAMPLE

Table D.9A presents the results of estimating the models of children's cognitive and language development. The first column lists the 24-month parent variables entered into the model as mediators of the 36-month child impact listed in the column heading. The second column shows the estimated relationships between each of the parenting outcomes in the model and the child cognitive outcome; and the third column indicates whether this association is significantly different from zero. For the fourth column, we use the estimated relationships

TABLE D.9A

ESTIMATED MEDIATING EFFECTS OF 24-MONTH PARENTING IMPACTS ON EARLY HEAD START PROGRAM IMPACTS ON ASPECTS OF CHILDREN'S COGNITIVE AND LANGUAGE DEVELOPMENT AT 3 YEARS OF AGE

24-Month Mediator	Estimated Effect of Parenting Outcomes on Bayley MDI	Significance Level	Percentage of Impact on Bayley MDI Associated with Mediator
Supportiveness: Semistructured Play	2.32	***	9.8
HOME Support of Cognitive, Language, and Literacy Environment	1.23	***	14.0
Read Daily	1.16	*	3.2
Total			**27.1**

24-Month Mediator	Estimated Effect of Parenting Outcomes on PPVT-III	Significance Level	Percentage of Impact on PPVT-III Associated with Mediator
Supportiveness: Semistructured Play	2.37	***	6.9
HOME Support of Cognitive, Language, and Literacy Environment	1.45	***	11.4
Read Daily	1.46	n.s.	2.8
Total			**21.1**

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

between the parenting outcomes and child outcomes and the impacts on parenting and child outcomes to compute the percentage of the impact on the child outcome that is associated with the impact on the parenting outcome.

These analyses indicate that children's scores on the Bayley MDI at 36 months are related to higher levels of parent supportiveness in semistructured play, greater support for cognitive and language development, and daily reading at 24 months. In total, the estimates suggest support for the idea that some of the Early Head Start impact on children's cognitive development could have occurred because of the program's impacts on parents' sensitivity and cognitive stimulation in interactions with the child, and their support in the home for the child's cognitive and language development. Estimates also suggest a positive relationship between 36-month PPVT III scores and parent supportiveness in play and support for cognitive and language development, but not daily reading. In total, these estimates suggest that part of the Early Head Start impact on children's receptive language ability at 3 years of age could have emerged because of earlier impacts on the parent's sensitivity, cognitive stimulation, and support for the child's language development across a range of parenting situations (during play, through regular daily reading, and during everyday interactions in the home).

Table D.9B displays the results of estimating the models of parenting behavior and positive aspects of children's social-emotional behavior at 36 months. The estimates indicate that children's engagement of the parent during semistructured play is positively related to the parent's warm sensitivity during observed semistructured play a year earlier; parent's emotional responsivity observed a year earlier; and the level of language and cognitive stimulation available in the home environment a year earlier. The relationship between child engagement

TABLE D.9B

ESTIMATED MEDIATING EFFECTS OF 24-MONTH PARENTING IMPACTS ON EARLY HEAD START IMPACTS ON POSITIVE ASPECTS OF CHILDREN'S SOCIAL-EMOTIONAL DEVELOPMENT AT 3 YEARS OF AGE

24-Month Mediator	Estimated Effect of Parenting Outcomes on Engagement	Significance Level	Percentage of Impact on Engagement Associated with Mediator
Warm Sensitivity: Semistructured Play	0.21	***	8.9
HOME Emotional Responsivity	0.05	***	3.7
HOME Support of Cognitive, Language, and Literacy Environment	0.05	***	6.1
Detachment: Semistructured Play	-0.01	n.s	0.5
Total			**19.3**

24-Month Mediator	Estimated Effect of Parenting Outcomes on Sustained Attention	Significance Level	Percentage of Impact on Sustained Attention Associated with Mediator
Supportiveness: Semistructured Play	0.15	***	8.5
HOME Support of Cognitive, Language, and Literacy Environment	0.04	**	5.9
Knowledge of Infant Development	0.16	**	6.1
PSI: Parental Distress	-0.006	**	4.5
Total			**25.0**

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

and parent detachment during play a year earlier was not significantly different from zero. In total, the estimates suggest that Early Head Start positive impacts on the child's engagement of the parent in semistructured play at 36 months are consistent with earlier positive program impacts on the parent's sensitivity during play, responsiveness to the child, and cognitive stimulation and support for language development in the home.

The results of estimating the model of child sustained attention to objects during semistructured play at 36 months indicate that the child's attention and focus on play is positively related to parent's sensitivity and cognitive stimulation during semistructured play a year earlier; support for cognitive development and language stimulation in the home environment in the previous year; and the parent's knowledge of child development measured at 24 months. Sustained attention toward objects during play at 36 months is negatively related to parental distress measured in the previous year. In total, the estimates suggest that part of the positive impact on children's sustained attention to objects during semistructured play at 36 months could have come about because of earlier favorable program impacts on parent supportiveness in semistructured play; cognitive stimulation and language support in the home environment, and knowledge of child development; and through reductions in parental distress.

Table D.9C shows the results of estimating the models of parenting behavior and negative aspects of children's social-emotional behavior at 36 months. The estimates indicate that children's negativity toward the parent in semistructured play at 36 months is inversely related to parents' warm sensitivity during semistructured play observed in the previous year; and positively related to levels of parental distress and intrusive behavior during semistructured play measured in the previous year. The relationship between child negativity at 36 months and the parent's use of physical punishment a year earlier is not significantly different from zero. In total, the estimates suggest that part of the reduction in levels of child negativity toward the

TABLE D.9C

ESTIMATED MEDIATING EFFECTS OF 24-MONTH PARENTING IMPACTS ON EARLY HEAD START IMPACTS ON NEGATIVE ASPECTS OF CHILDREN'S SOCIAL-EMOTIONAL DEVELOPMENT AT 3 YEARS OF AGE

24-Month Mediator	Estimated Effect of Parenting Outcomes on Child Negativity	Significance Level	Percentage of Impact on Negativity Associated with Mediator
Warm Sensitivity	-0.05	***	6.0
Physical Punishment Last Week	0.02	n.s.	1.7
PSI: Parental Distress	0.004	**	7.0
Intrusiveness: Semistructured Play	0.06	***	3.6
Total			**18.2**

24-Month Mediator	Estimated Effect of Parenting Outcomes on Aggressive Behavior	Significance Level	Percentage of Impact on Aggressive Behavior Associated with Mediator
Warm Sensitivity: Semistructured Play	-0.46	***	7.5
Physical Punishment Last Week	1.52	***	17.3
PSI: Parental Distress	0.19	***	44.6
Regular Bedtime	-0.32	n.s.	2.7
Total			**72.0**

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

parent during semistructured play that came about through Early Head Start participation might be associated with Early Head Start-induced increases in parent warmth and sensitivity during play and reductions in parental distress and intrusiveness during play measured one year earlier.

The estimates of the model of children's aggression at 3 years of age and parenting behavior in the previous year indicate that children's aggression is inversely related to the parent's warm sensitivity during semistructured play and positively related to the use of physical punishment and levels of parental distress measured in the previous year. The relationship between aggression and the parent's setting a regular bedtime for the child is not significantly different from zero. In total, the estimates indicate that part of the Early Head Start impact reducing levels of aggression in 3-year-old children is partly attributable to the program's positive impact on parents' warm sensitivity toward the child during play and to the program's impact reducing the incidence of physical punishment in the previous year. The relationship between children's aggressive behavior and earlier levels of parental distress appears fairly large, but the relationship may be overstated because of measurement error. Part of the correlation may occur because distressed parents may view their children's behavior more negatively than an outside observer would.

To check the robustness of these findings, we also substituted an alternative measure of parent reading: reading at bedtime. The alternative variable, reading at bedtime, indicates that the parent followed a bedtime routine most days in the past week and volunteered that it included reading. We found that the proportion of the impact on the Bayley MDI and PPVT-III at 36 months that is associated with bedtime reading is very similar to the proportion associated with daily reading, and the overall proportion of the impact associated with all of the parenting mediators in each of the models changes by only about 3 percentage points.

In summary, the estimates of models relating children's behavior at 36 months to parenting behavior measured a year earlier in the full sample suggest some support for the theory that part of the Early Head Start program impact on children could have come about because of earlier favorable changes in parenting behavior. The estimates of the relationships between parenting behavior and children's outcomes and the Early Head Start program impacts on these outcomes are consistent with the theory, although the models we have estimated are not structural and therefore cannot establish a causal link between the parenting impacts and impacts on children.

D. MODELS BY PROGRAM APPROACH

Early Head Start programs that chose different approaches to service delivery typically also had different theories of change regarding how the program would intervene in children's lives. Center-based programs, which offered center-based child development services as well as parent education, expected changes to occur mainly through the direct services, with only a small impact of the program coming through changes in parenting. Home-based programs focused child development services directly on the child and on the parent, because these programs expected the parent to enhance the effects of the program on the child. Mixed programs, which blended center-based and home-based services in different patterns, would likely fall in the middle in terms of the expected program effects on the child that would be mediated by the parent.

To explore whether the impacts we have found for parenting measures at 24 months and child outcome measures at 36 months are consistent with the program-specific theories of change, we estimated mediated models by program approach that were similar to those estimated for the full sample. When a particular child outcome was not very different for program and control groups within a program type, we did not run a model predicting parenting effects on that impact. Although parenting variables likely do affect the child outcome in that case, it did not make sense to estimate the model because Early Head Start had no impact on that outcome. We also did not estimate a model if the impacts on parenting outcomes were not very different from zero at 24 months, because once again, while parenting behavior likely has an influence on particular child outcomes, parenting could not have been an important mediator if the program impacts on parenting were very small or zero. In some cases, when a particular parenting outcome was not changed by Early Head Start at 24 months, we substituted a similar parenting outcome from the same domain for which the program did have an impact so that we could estimate whether there was a relationship between parenting impacts and later child impacts. These substitutions were possible because parenting variables were selected for the main model so that a single variable represented a domain of parenting, and often, alternative variables measuring similar aspects of parenting were available.

Table D.9D presents the results of estimating models of the 36-month child outcomes by program approach. For center-based programs, we estimated models of cognitive and language development and aggressive behavior. Models of the other three social-emotional outcomes could not be estimated because, within the center-based group, Early Head Start had no impact on nearly all key parenting mediators that might predict these outcomes. In each model that we did estimate for families in center-based programs, one or two of the parenting mediators was not changed by Early Head Start at 24 months, so the models did not include all of the variables used for the full sample. The results of the estimation suggest that parenting behavior at 24 months is related to the later child outcomes in the expected directions, but the implied pathway for program impacts through parenting behavior to children in the later period appears to be fairly small, in part because few of the parenting influences were affected by the program in the earlier period.

TABLE D.9D

ESTIMATED EFFECTS OF PARENTING IMPACTS ON CHILDREN'S DEVELOPMENT AT THREE YEARS

	Center-Based Programs		Mixed-Approach Programs		Home-Based Programs	
Parenting Mediators	Estimated Effect of Parenting Variables on Child Outcome	Percentage of Child Impact Associated with Mediator	Estimated Effect of Parenting Variables on Child Outcome	Percentage of Child Impact Associated with Mediator	Estimated Effect of Parenting Variables on Child Outcome	Percentage of Child Impact Associated with Mediator
Bayley MDI						
Supportiveness: Semistructured Play	n.a.	n.a.	2.24***	-149.3	1.92***	5.0
HOME Support of Cognitive, Language, and Literacy Environment	n.a.	n.a.	1.04**	-114.0	1.41***	16.0
Parent-Child Play	1.85*	2.9	n.a.	n.a.	n.a.	n.a.
Read Daily	0.14	0.3	1.75	-65.3	1.31	1.7
Percentage of Child Outcome Attributed to Parenting	--	*3.2*	--	*-328.6*	--	*22.6*
PPVT Score						
Supportiveness: Semistructured Play	n.a.	n.a.	3.00***	13.6	0.79	2.7
HOME Support of Cognitive, Language, and Literacy Environment	n.a.	n.a.	1.16*	8.4	1.30**	19.2
Parent-Child Play	1.31	-2.0	n.a.	n.a.	n.a.	n.a.
Read Daily	5.86***	14.5	0.01	0.0	0.55	0.9
Percentage of Child Outcome Attributed to Parenting	--	*12.5*	--	*22.0*	--	*22.8*
Sustained Attention with Objects: Semistructured Play	Not Estimated					
Supportiveness: Semistructured Play			0.09*	7.3	0.12***	5.3
HOME Support of Cognitive, Language, and Literacy Environment			0.03	4.4	0.04	6.9

Table D.9D (*Continued*)

	Center-Based Programs		Mixed-Approach Programs		Home-Based Programs	
Parenting Mediators	Estimated Effect of Parenting Variables on Child Outcome	Percentage of Child Impact Associated with Mediator	Estimated Effect of Parenting Variables on Child Outcome	Percentage of Child Impact Associated with Mediator	Estimated Effect of Parenting Variables on Child Outcome	Percentage of Child Impact Associated with Mediator
Knowledge of Infant Development Inventory			0.19	4.9	0.28***	15.1
PSI: Parental Distress			-0.01	5.8	-0.00	1.9
Percentage of Child Outcome Attributed to Parenting			--	*22.4*	--	*29.3*
Engagement of Parent: Semistructured Play	Not Estimated					
Warm Sensitivity: Semistructured Play			0.18***	15.2	0.22***	4.7
HOME Emotional Responsivity			-0.003	-0.3	0.11***	6.8
HOME Support of Cognitive, Language, and Literacy Environment			0.06*	9.0	0.05*	5.0
Parent-Child Play			n.a.	n.a.	n.a.	n.a.
Detachment: Semistructured Play			-0.14**	11.4	n.a.	n.a.
Percentage of Child Outcome Attributed to Parenting			--	*35.3*	--	*16.5*
Negativity toward Parent: Semistructured Play	Not Estimated				Not Estimated	
Warm Sensitivity: Semistructured Play			-0.01	0.8		
Physical Punishment in Past Week			-0.03	-2.4		
PSI: Parental Distress			0.01	6.8		
Intrusiveness: Semistructured Play			0.07**	4.9		
Percentage of Child Outcome Attributed to Parenting			--	*10.1*		
Aggressive Behavior						
Warm Sensitivity: Semistructured Play	n.a.	n.a.	-0.54*	12.1	-0.33	33.6

Table D.9D (*Continued*)

Parenting Mediators	Center-Based Programs		Mixed-Approach Programs		Home-Based Programs	
	Estimated Effect of Parenting Variables on Child Outcome	Percentage of Child Impact Associated with Mediator	Estimated Effect of Parenting Variables on Child Outcome	Percentage of Child Impact Associated with Mediator	Estimated Effect of Parenting Variables on Child Outcome	Percentage of Child Impact Associated with Mediator
	2.13***	10.2	1.34**	17.6	1.44***	81.2
PSI: Parental Distress	n.a.	n.a.	0.14***	35.9	0.20***	393.7
Regular Bedtime	-1.45**	7.5	0.14	-0.5	-0.30	20.7
Percentage of Child Outcome Attributed to Parenting	--	*17.8*	--	*65.1*	--	*529.2*

SOURCE: Parent interviews, child assessments, and assessments of parent-child interactions when children were approximately 24 and 36 months old.

For home-based programs, we estimated all of the models except for negativity toward the parent during semistructured play at three years. At 24 months, Early Head Start had a favorable impact on nearly all of the aspects of parenting used in these models, so only one variable was omitted from one model (engagement of parent). The estimated relationships between parenting behavior variables at 24 months and children's outcomes at 36 months were consistently in the expected directions. Overall, the estimates suggest that part of the Early Head Start impact on the cognitive, language, and socio-emotional development of children in home-based programs could have emerged because of earlier impacts on related parenting behavior.

The model for aggressive behavior among children in home-based programs has the striking result that more than 500 percent of children's aggressive behavior at 36 months is potentially associated with the earlier changes in parenting. Most of the association between parenting and children's aggression stems from a large estimated relationship between parenting behavior at 24 months and children's aggressive behavior at 36 months, which again could be partly attributable to measurement error leading to some degree of spurious correlation between these two measures.

For mixed-approach programs, we estimated all of the models, and since Early Head Start influenced all key parenting outcomes at 24 months, none had to be omitted from any model. For the most part, the estimated relationships between parenting behavior at 24 months and child outcomes a year later are usually in the expected directions. Supportiveness, cognitive stimulation, and language support are all positively related to cognitive and language development and positive aspects of social-emotional development and inversely related to negative aspects of social-emotional development. Intrusiveness, detachment, and parental distress are all inversely related to positive aspects of social-emotional development and positively related to negative aspects of social-emotional development. Within the mixed-program group, there are a few exceptions to these rules, but in these cases the estimates are usually small (not different from zero) and the percentage of the child impact associated with the parenting mediator is small. Overall, the estimates are consistent with the theory that, for families in mixed-approach programs, part of the Early Head Start impact on children's outcomes may be mediated by earlier impacts on parenting behavior.

In the model relating the Bayley MDI scores to parenting behavior a year earlier for families in mixed-approach programs, the estimated relationships appear to be particularly strong, which makes the proportion of the Bayley MDI impact that is associated with earlier parenting impacts unreasonably high. Unfortunately, such a result is possible with the two-stage estimation procedure, which cannot force the results to fall between 0 and 100 percent. Instead, the procedure takes the estimated association between the parenting outcomes and child outcomes and checks the consistency of the earlier parenting impacts and that association with the ultimate child impacts a year later. An unreasonable result such as this can suggest either that the theory of which parenting behaviors affect the child outcome is incorrect, or (more likely) that this model is incorrect because it does not correctly capture all of the structural relationships among parenting behavior, genetics, other home influences, and children's outcomes.

Nevertheless, while the specific parameter estimates from the models are likely to be biased, the overall pattern of association between parenting impacts at 24 months and children's impacts at 36 months can provide an indication of whether the impacts are consistent with the programs' theory of change. Estimates for mixed and home-based programs do lend some support to Early Head Start program theories of change that suggest a role for parenting as a mediator of program impacts on children. For center-based programs, parenting appears not to have had much of a role in mediating program impacts on children, in large part because few impacts on parenting were found at the 24-month assessment.

APPENDIX E

SUPPLEMENTAL TABLES BY CHAPTER

CONTENTS

This Appendix presents tables that contain additional data cited in Chapters II through VII. The table numbers indicate which chapter they relate to, for example, tables for chapter IV are numbered E.IV.1, E.IV.2, and so forth. They are presented in the order in which they are referred to in the text of the main report.

Section **Page**

APPENDIX E.II

APPENDIX E.II.A RANDOM ASSIGNMENT E.3
TABLE E.II.B EXPLANATORY VARIABLES FOR REGRESSIONS E.13

APPENDIX E.IV CHAPTER IV TABLES E.19

APPENDIX E.VI CHAPTER VI TABLES E.39

APPENDIX E.VII CHAPTER VII TABLES E.91

APPENDIX E.II.A

RANDOM ASSIGNMENT AND RELATED ISSUES IN THE EARLY HEAD START EVALUATION: COMMONLY ASKED QUESTIONS AND ANSWERS

Mathematics Policy Research, Inc.

February 21,1997

Since the beginning of random assignment and program enrollment in June 1996, Mathematica has responded to numerous questions. fu some instances, we and ACYF have clarified procedures, modified approaches, and developed new policies. This document brings together the most important questions that EHS programs and local research teams have been asking. This document includes some questions from a previous Q&A document about random assignment and several new questions that have come up in the past several months. We begin with a review of the key steps in random assignment. The Q&As are grouped under random assignment, maintaining the research sample, and completing the HSFIS application and enrollment forms. If you have any questions about these procedures or how to handle specific situations, contact Diane Paulsell at MPR at (609) 275-2297 (e-mail: dpaulsell@mathematicampr.com).

A. OVERVIEW OF RANDOM ASSIGNMENT PROCEDURES

All programs should be submitting families for random assignment according to the following procedures:

1. Determine each family's eligibility for Early Head Start (EHS), and for those who are eligible, complete the full HSFIS application and enrollment forms.
2. Within one month of application, transmit the following information to Mathematica Policy Research, Inc. (MPR) and to the local research partner:
    - A fax cover sheet listing the names of applicants, verification of three aspects of their eligibility for the research sample, and the subgroup to which they belong (if random assignment subgroups have been identified for the program)
    - Pages 1-4 of the HSFIS form for each applicant listed on the fax cover sheet
    - A copy of the signature page of the consent form for each applicant listed on the fax cover sheet; this information should be sent to Rosiland Page (phone: 609-897-7413; fax: 609-936-1462; e-mail: rpage@mathematica-mpr.com).
3. Receive lists of families selected for the program and for the comparison group from MPR (usually within 48 hours). (At the request of the Denver program, we send that site only the list of program families.)
4. Notify families selected for *the* program group, enroll them in the program, and begin providing services as soon as possible. (The local research partner will notify families assigned to the comparison group.)

5. Send full copies of the HSFIS application and enrollment forms for each applicant submitted for random assignment to NPR within two weeks. MPR will do the data entry until the automated HSFIS is ready for use.

6. Local research staff should periodically fax a listing to MPR that documents when each comparison group family was notified of its status.

B. RANDOM ASSIGNMENT

1. Which families are eligible to participate in the research?

To participate in the research, all families must meet the general EHS eligibility criteria established by ACYF and the more specific criteria established by individual EHS programs. In addition, all families who meet these criteria must also meet the following conditions:

- The family must include a child who is 12 months old or younger on the date of application or a pregnant woman. In addition, this child must have been born or have an expected due date that falls between September 1, 1995 and June 30, 1997.
- The family must not have participated in the Comprehensive Child Development Program (CCDP) for 3 months or more during the previous 5 years.
- The family must not have participated in Head Start, Early Head Start, a Parent Child Center (PCC), or another similar program for 3 months or more during the previous 12 months.
- The family must be enrolled (submitted for random assignment) no later than June 30, 1998.

2. Must programs submit all eligible families for random assignment?

Yes. Programs should not enroll any families who meet the eligibility criteria outlined above outside of the random assignment process unless an exemption has been granted by ACYF. Non-research program slots should only be used for the following types of families:

- Families who are eligible for EHS but do not meet the research eligibility requirements because their child is more than 12 months old; their child's birthrate falls outside of the eligibility window; or they previously participated in CCDP, Head Start, Early Head Start, PCC, or another similar program
- Families assigned to the program group who will not participate in the research because they are part of a multiple family household as described in question 7 below
- Families who are granted an exemption from random assignment by ACYF

3. On what grounds will ACYF grant an exemption from random assignment?

ACYF will grant an exemption from random assignment only in cases of extreme need. For example, ACYF may grant an exemption if program enrollment is necessary to protect a child from physical harm.

4. What steps should a program follow to request an exemption?

The program director must request an exemption *before* submitting the family for random assignment. An exemption cannot be requested after random assignment because a family was assigned to the comparison group. To request an exemption, the program director must first make a request to her or his local research team. The local research team will review the request, discuss it with the program, and, if appropriate, forward it to ACYF. The final decision about whether to grant an exemption from random assignment will be made by ACYF. Contact Helen Raikes (202-205-2247) to request an exemption.

5. What should a program do if it cannot obtain informed parental consent for minors to participate in the EHS Evaluation?

For minors to participate in the evaluation, it is very important to obtain informed parental consent. However, we understand that in certain cases it may be nearly impossible for a program to obtain such consent for a minor (for example, if the minor is living in a separate household, is estranged from parents, or is emancipated). Regardless, we request that programs make every effort to obtain the parent's or a guardian's consent in all cases, even if such consent is not required for the minor to receive services. But, if it is impossible or prohibitively expensive for a program to obtain such consent, we will randomize the minor without consent if the program takes the following steps:

- Write a memo to MPR that clearly and succinctly explains (1) the local program requirements for serving a minor without parental consent, and (2) the state guidelines for providing other types of public services to minors without consent (for example, the general guidelines that AFDC or WIC use to provide assistance to minors.) An *example* of such an explanation is as follows:

  In this state, minors can receive public services as independent cases and without parent or guardian consent if they are living apart from their parent or guardian; consequently, the local EHS program can also provide services to the individual without parent or guardian consent. In addition, circumstances are such that we cannot reasonably be expected to obtain parent or guardian consent in this and other such cases. Therefore, we ask that Mathematica randomize this minor for the EHS Evaluation without such consent.

- Reference this memo on the consent form for all such cases where parent or guardian consent cannot be obtained.

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- In the case of legally emancipated minors, provide documentation of emancipation if at all possible. Documentation, if it exists, will likely vary by state. If it is not possible to obtain such documentation, the above memo should be referenced.

- In the case of a minor who is married, the husband should not sign the consent form and is not considered a legal guardian. A minor who is legally married is recognized as having achieved the age of majority for any legal purpose and is responsible for her own acts. Therefore, a mother who is younger than 18 and married should sign the consent form herself.

6. How will MPR randomly assign families in multiple family households?

We want to avoid situations in which a program family and a comparison group family live together because it may be difficult to prevent the comparison group family from receiving services (comparison family members may be present during home visits, for example). Therefore, when two or more families-related or not-are living together in the same home, they will be considered a multiple family household and if they both (all) apply to the EHS program, they will be treated as *one family* for purposes of random assignment. In other words, they will be assigned to the same group, and both will be considered program group families, or both will be considered comparison group families. If both families are selected for the program group, the EHS program may decide whether to serve both families or not. However, only one family will participate in the national evaluation assessment activities, and only that family will count toward the 75 program families required for the research sample. Similarly, if the two (or more) families are assigned to the comparison group, MPR will select just one of them to participate in the evaluation assessments.

7. What is the program's role in handling multiple family households (MFHs)?

Whenever possible, programs should notify MPR about a family's status as an MFH *prior to* random assignment. We will not re-assign families after random assignment, as this will diminish the validity of random assignment and will negatively affect the- evaluation. Program staff should take the steps listed below when submitting families from MFHs for random assignment:

- *If MFH families apply to EHS at the same time:* The program should verify that the families are part of an MFH and indicate this on each family's HSFIS application. Program staff should clearly indicate on the top of the HSFIS form and on the cover page of their submission to Mathematica that the families are part of an MFH. This can be done by writing "MFH" in the upper right hand comer of the first page of the HSFIS application form and by writing "MFH" next to each family's information on the submission cover page. If the families are assigned to the program group, MPR will randomly select one family to participate in the research assessments. The program should then serve this family; it has the option to decide whether and to what extent it will serve the other family(ies).

- *If an EHS applicant is living in the same household with a family already enrolled in the program group and the program wants to serve this family*: The program should verify that the applicant family lives with the programs group family and clearly indicate both on top of the HSFIS form and on the cover page of their submission that the family lives with a program group family. This can be done by writing 1V4FH-P in the upper right hand corner of the first page of the HSFIS application form and by writing NIFH-P next to the applicant's information on the submission cover page. The program-should also attach a copy of the first page of the program family's HSFIS application so that MPR can match the new applicant to the program family. The program may decide whether or not to serve this new family.

  However, the family will not become part of the research sample, will not count toward the 75 program families required for the research sample, and will not participate in the research assessments.

- *If an EHS applicant is living in the same household with a comparison group family*: Because programs are not providing services to comparison group families, we recognize that these cases may be more difficult for programs to identify. However, when programs are able to identify such cases, the applicants will not be eligible to receive program services and will not become part of the research sample. Therefore, programs should not recruit families who are living in the same households with a comparison-group family.

8. How does MPR handle the random assignment of twin children?

The family unit, not the child, is randomly assigned to either the program group or the comparison group. If the family is assigned to the program group, both twins may be served by the EHS program, but only one twin will be assessed for research purposes. NIPR will select the evaluation focus child at random. If one twin has a disability, that will have no bearing on the selection of the focus child-it will still be random.

9. How can programs ensure that they meet the 10 percent guideline for enrolling children with disabilities?

At least 10 percent of the children enrolled in Head Start must be children with disabilities. Early Head Start programs who are beginning enrollment and who are enrolling pregnant women should work with project officers to ensure that they follow a recruitment strategy likely to result in an enrollment in which at least 10 per cent of the children have disabilities, or in which risk factors for disabilities are present, as relevant within seven states for which specified categories of risk constitute eligibility. All programs will need to demonstrate that they have an intensive recruitment effort for children with identified disabilities and that they are working with appropriate agencies (such as United Cerebral Palsy, Association for Retarded Persons, and neonatal intensive care units) to recruit children with disabilities.

10. Should families whose incomes exceed the Head Start income eligibility requirement be submitted as a subgroup?

We will not form subgroups for families who are over income. Since no more than 10 percent of the EHS program enrollment can be families who are over the income eligibility requirement, we recommend recruiting less than 10 percent to prevent having more of these families selected into the program group than the comparison group.

C. MAINTAINING THE RESEARCH SAMPLE

1. After programs have filled all of their slots, it is likely that a few families will leave the program. If a family leaves the program, what procedures should be followed to fill the vacancy?

Programs should submit applicants for random assignment whenever a vacancy occurs, until the maximum research sample size has been reached. Applicants (whether newly recruited or from a waiting list) should be sent to MPR only when the program has an opening. For every one opening, the program can send from one to "a few" applicants for random assignment (except for the Utah program, which must send an even number of applicants). Since we conduct random assignment one case at a time (except in Utah, where we use a batch process), if the first family is assigned to the program group, then this family can be enrolled in the program and the rest can be returned to the waiting list. If, however, the first family is assigned to the comparison group, then we will randomly assign the remaining families, one by one, until a family is assigned to the program group and the vacancy if filled.

2. What happens if a family drops out of the program or moves out of the service area after being randomly assigned to the program but before the program begins delivering services?

These families will be treated the same as families who drop out of the program at any other time. They will still be included in the program group of the research sample. The data collectors will make every reasonable effort to follow families who drop out at any time in the process and, whenever possible, conduct assessments on the same schedule as planned for other families in the research sample. In its analyses, MPR will adjust for the extent to which the families receive services, but it is very important that programs make every effort to retain, to the extent possible, all families who are selected for the EHS program group. ***It is very important to be sure that the family being recruited understands and is truly interested in receiving program services and participating in the research before completing the application/enrollment forms that are submitted to MPR.***

3. What happens if a comparison group family moves out of the service area?

If a comparison family moves away from the EHS service area, we do not consider it to have dropped out of the research sample. Wherever comparison group families live, they will receive whatever services are normally available in the community without EHS, and therefore constitute a legitimate comparison. The national evaluation will make reasonable attempts to follow such families and to conduct the interviews and assessments. MPR will work with the local researchers to determine whether it is feasible to continue following such families and what costs are reasonable to incur for this purpose.

4. What happens if a family says it no longer wishes to participate in the research?

All families participating in the EHS national evaluation may refuse to participate in the research at any time. However, once a family goes through random assignment, it will not be dropped from the research sample, and NPR, through the local researchers, will continue to invite these families to participate in future rounds of interviews and assessments. As with all contacts with families, MPR's approach to communicating with families who have refused to participate will ensure that they are contacted in a respectful and sensitive manner.

When a program family refuses to participate in data collection activities, the local researcher will contact program personnel. Working together, the research and program staff will decide on the appropriate approach to take with the family, taking into account the family's current circumstances and needs. They should remind the family of its commitment to participate in both the program and the research. They should also be aware that the family's circumstances may change, and the family may decide to participate in the program and research at a future date. If the researcher finds that the family still refuses at the time of the next round of data collection, the researcher should again notify the program so that the program can counsel the family about its options. If, after considering various alternatives the family still refuses to participate in the research, the program should disenroll the family. The research team will continue to attempt to contact the family at the time of future data collections to obtain minimal data for the purpose of understanding why refusals occur.

5. What should a program do if it discovers that a family is ineligible for EHS after that family has been randomly assigned?

The program should write a memo to MPR documenting the specifics of the case and requesting directions for how to proceed. If the family was assigned to the program group, the program should explain the error to the family and explain that it cannot continue to receive services. If the family was assigned to the comparison group, the local researcher should inform the family that it will no longer be part of the research. It is very important that programs check eligibility carefully before submitting families for random assignment so that the number of such cases is kept to a minimum.

6. Will families in which the focus child dies or is miscarried continue participating in the research?

No. MPR will not continue collecting data from families after the focus child has died or is miscarried. While we feel that some valuable information about service use could be collected from these families, we have decided that problems with continuing data collection outweigh the advantages. It is up to the program to decide whether it will continue providing services to these families. In addition, NPR will not change the focus child after he or she has been selected, even if the focus child dies and another sibling is eligible to participate in the research.

7. What happens if the focus child's primary caregiver changes?

Because the focus of our research is the child, when the focus child becomes the responsibility of a new primary caregiver, MPR will follow the child. For example, a child may begin living with a different parent or a grandmother midway through the evaluation. It is up to the program to decide how it wishes to handle service delivery to the child's new primary caregiver.

Cases of adoption constitute an exception to this rule. If the focus child is adopted by another family, we may not be able to follow the child, because the birth mother may not know the identity of the adoptive parents and adoption agencies may not provide this information. Therefore, MPR will stop collecting data from families in which the focus child is adopted by another family.

8. Can program group families who move to the service area of another EHS research site enroll in EHS in their new location?

Yes. If a program group family moves to the service area of another research site, the family can enroll in the new program without going through random assignment a second time. However, it is up to the new program to determine whether it will enroll the family. Because each local program has tailored its eligibility criteria to its local area and program design, the family may not be eligible for the new program. Also, the new program may already have a waiting list for families who want to enroll in EHS.

9. Can comparison group families receive services that are similar to EHS services?

Comparison group families are permitted to apply for any services available in their communities, except those services restricted to EHS program participants. At one site, several comparison group families have enrolled in a local CCDP program. At another site, a comparison group family enrolled in Child Development Associate (CDA) training provided by the EHS program to community members who are interested in becoming child care providers. MPR believes these situations provide a valid counterfactual, because they represent the types of services available to non-EHS families in local communities.

10. What happens if comparison group families receive program services?

Programs should make every effort to avoid providing services to comparison group families. If you discover that services have mistakenly been provided to a comparison group family, please document the type and extent of services received and notify NPR as soon as possible. For national evaluation purposes, comparison group families who receive program services will still be counted as comparison group members when the data are analyzed. We need the documentation so we can understand how these families differ from comparison members who are not receiving services.

D. THE HEAD START FAMILY INFORMATION SYSTEM (HSFIS)

1. Who can programs call about questions relating to the HSFIS?

Questions about the HSFIS should be directed to Lihong Ma at NEE (301-738-1122). A back-up is Bill Wilson (202-205-8913). Ellen Kisker at NPR (609-275-2379) can also field questions, particularly pertaining to the application and enrollment forms.

2. Do the complete HSFIS application and enrollment forms have to be completed before random assignment?

Yes. However, only the first 4 pages need to be sent to MPR at that time. The rest of the HSFIS pages can be sent later.

3. Which version of the HSFIS forms should programs use?

Program should use the new version of the HSFIS application and enrollment forms that were provided to programs at the December 1996 Infant/Toddler Institute. However, programs should continue using the first 4 pages of the July version (the Preface), even though these pages were not included with the most resent version. These are the four pages that programs fax to MPR when submitting names for random assignment.

4. If the applicant is a pregnant woman, do programs have to fill out the HSFIS information on the program child after the child is born and then send that to MPR?

Yes. ACYF has specified the need for this information. Programs must send HSFIS application and enrollment information on program children to MPR after the child is born. At some point in the future it may be possible for MPR to obtain this information in an automated fashion from the HSFIS contractor. However, until we notify programs otherwise, programs should provide us with the hard copy HSFIS forms. Programs are not required to collect this information for babies born to comparison group families. This information will be collected by local research teams as described under question 5.

5. What is the program's role in collecting HSFIS data on the child of a comparison group family?

The program is responsible for completing the HSFIS application and enrollment forms for all applicants at intake, including those who get assigned to the comparison group. However, some women enroll in EHS during pregnancy, before the birth of the focus child. The program is not responsible for collecting HSFIS application and enrollment data for children born after enrollment who are assigned to the comparison group. In addition, the program is not responsible for collecting HSFIS service module data for comparison group families.

6. What is the local research team's role in collecting HSFIS data on babies born to comparison group families after enrollment?

Local research teams will be responsible for collecting HSFIS application and enrollment data on babies born to comparison group mothers enrolled during pregnancy. MPR is developing a form for data collectors to use at the time of the 12-month Parent Services Follow Up Interview (PSI). Some questions from the HSFIS will be omitted because the information will be obtained during other interviews with the parent. Although we do not think that the subcontract budget implications of adding this form will be significant, we will monitor the actual costs for completing the PSI and make adjustments as necessary.

7. Does the "Project Head Start Consents, Authorizations, and Releases Form" need to be completed and medical records information obtained (to complete the HSFIS forms) and sent to MPR before random assignment?

It would be ideal to have the forms and information at the point of random assignment, but it is not imperative. We understand that obtaining medical releases and records information takes time and we do not wish to hold up the random assignment process because of it. Programs should send the Head Start release forms and completed HSFIS question based on the medical records to MPR a soon as possible after they are completed.

APPENDIX E.II.B

TABLE E.IIB

EXPLANATORY VARIABLES FOR REGRESSIONS

Variable	Percent of Families	Number of Sites in Which the Variable Varies
Family and Parent Characteristics		
Age of Mother		
Younger than 20[a]	39	17
20 to 25	33	17
25 or older	28	16
Race and Ethnicity		
White non-Hispanic[a]	37	17
Black non-Hispanic	35	16
Hispanic	24	17
Other (Asian or Pacific Islander, American Indian, Eskimo, Aleut)	5	16
English Language Ability		
Primary language is English[a]	79	16
Primary language is not English but the applicant speaks English well	10	16
Primary language is not English and the applicant does not speak English well	11	12
Highest Grade Completed		
Less than 9[a]	11	17
9 to 11	37	17
12 or earned a GED certificate	28	17
More than 12	24	17
Primary Occupation		
Employed[a]	23	17
In school or a training program	22	17
Unemployed	28	17
Out of the Labor Force	27	17
Living Arrangements		
Living with a partner[a]	25	17
Living with other adults	39	17

TABLE E.IIB *(continued)*

Variable	Percent of Families	Number of Sites in Which the Variable Varies
Living with no other adults	36	17
Number of Children in the Household		
Ages 0 to 5	0.5[c]	17
Ages 6 to 17	0.5[c]	17
Household Income as a Percent of the Poverty Level (Percent)		
Less than 33[a]	25	17
33 to 67	25	17
67 to 99	21	17
100 or more	11	17
Missing	18	17
Welfare Receipt		
AFDC/TANF	34	17
Food Stamps	48	17
WIC	87	17
SSI	7	17
Inadequate Resources		
Food	5	17
Housing	12	17
Money	20	17
Medical care	14	17
Transportation	21	17
Number of Moves in the Past Year	0.9[c]	17
Random Assignment Date		
Before 10/96[a]	36	15
10/96 to 6/97	31	16
After 6/97	33	16
Child Characteristics		
Age of Focus Child (Months)		
Unborn	25	17
Less than 3[a]	21	17
3 to 6	22	17
6 or more	32	17

TABLE E.IIB *(continued)*

Variable	Percent of Families	Number of Sites in Which the Variable Varies
Birthweight Less than 2,500 Grams[b]	7	17
Born More Than 3 Weeks Early[b]	10	17
Male	51	17
Received an Evaluation Because of Concerns About the Child's Overall Health and Development or Because of Suspected Developmental Delay[b]	5	17
Risk Categories		
Has established risks[b]	8	17
Has biological or medical risks[b]	12	17
Has environmental risks[b]	24	17
Previously Enrolled in Head Start or Another Childhood Development Program[b]	13	17
Missing Section on Child Characteristics[b]	8	17

SOURCE: HSFIS application and enrollment forms.

NOTE: In addition to the variables shown above, we included a control variable for child age (in months) for child outcomes that were not age-adjusted.

[a] This indicator variable was omitted from the explanatory variables in the regression models.

[b] These variables pertain to families with focus children who were born at the time of program application. The variables were set to zero for families with unborn focus children (because an indicator variable for these families was included in the regression models), but the figures in the second and third columns of this table pertain only to those with born children.

[c] Figures for these continuous variables are variable means.

APPENDIX E.IV

TABLE E.IV.1
FAMILY CHARACTERISTICS, BY SITE

Subgroup	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Average Across Sites
Race/Ethnicity																		
White non-Hispanic	27	79	4	19	77	21	75	82	1	60	12	17	27	3	4	20	32	36
Black non-Hispanic	72	1	93	5	15	58	17	4	46	23	87	40	34	9	0	78	3	34
Hispanic	1	13	3	66	5	20	3	7	40	4	1	40	31	85	92	1	3	24
Other	1	6	1	9	3	1	5	8	12	13	0	4	9	3	3	1	2	5
Primary Language																		
English	97	97	97	63	94	85	94	88	60	92	99	71	64	24	19	98	97	79
Other	3	3	3	37	6	15	6	12	40	8	1	29	36	76	81	2	3	21
Age of Child at Enrollment																		
Unborn	33	26	32	38	15	36	33	20	7	66	30	14	7	16	18	13	12	24
0-4 months	35	34	35	36	36	30	41	23	40	31	40	8	45	44	42	42	45	36
5-12 months	33	40	33	26	49	34	26	57	52	3	30	78	48	40	40	46	42	40
Child's Birth Order																		
Firstborn	43	68	100	73	45	57	61	56	89	61	84	59	45	44	53	77	53	63
Later-Born	57	32	0	27	55	43	39	44	11	39	16	41	55	56	47	23	47	37
Mother's Age When Child Was Born																		
Under 20	30	34	68	36	33	45	37	30	60	36	89	36	22	16	36	37	24	39
20 or older	70	66	32	64	67	55	63	70	40	64	11	64	78	84	64	63	76	61
Child's Gender																		
Female	55	52	44	54	47	50	47	49	45	51	52	54	42	51	44	44	49	49
Male	45	48	56	46	53	50	53	51	55	49	48	46	58	49	56	56	51	51
Family Was Receiving AFDC/TANF Cash Assistance																		
Yes	69	8	53	25	12	51	50	35	32	55	41	31	13	29	31	29	33	35
No	31	92	47	75	88	49	50	65	68	45	59	69	87	71	69	71	64	65
																		0
Primary Occupation																		
Employed	14	23	22	21	43	15	25	29	10	17	8	35	30	17	23	43	24	23
In school or training	19	20	40	17	15	27	11	19	48	14	67	31	6	5	10	19	8	22
Other	67	57	39	61	42	57	64	52	42	69	25	34	64	79	66	38	68	54
Highest Grade Completed																		
Less than 12th grade	34	35	52	49	29	57	45	33	70	42	79	45	32	66	86	38	28	48
12th grade or GED	42	30	29	22	40	25	35	34	10	33	14	24	37	14	9	40	43	28
More than 12th grade	24	35	19	29	31	19	21	33	19	25	7	31	32	20	5	22	29	24
Living Arrangements																		
With spouse	10	62	3	23	34	14	15	34	11	21	5	13	53	39	41	17	30	25
With other adults	39	29	16	62	26	46	46	22	52	43	84	57	22	26	31	40	32	40
Alone	51	9	81	14	40	39	39	44	37	36	12	30	24	36	27	44	37	35
																		0
Number of Maternal Risk Factors																		
0-1	8	41	7	18	30	8	12	23	10	15	2	18	44	18	8	22	23	18
2-3	56	48	47	56	58	56	55	62	55	55	50	62	48	64	57	52	58	55
4-5	35	11	46	26	12	36	33	14	35	31	48	20	9	18	34	26	20	27

Source: Head Start Family Information System application and enrollment forms.

Note: Sites are presented in random order.

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TABLE E.IV.2

CHARACTERISTICS OF FAMILIES IN KEY PROGRAM SUBGROUPS

(Percents)

Subgroup	Average Across Sites	1997 Program Approach			Overall Implementation			Implementation of All Services		State Requires Parents of Infants to Work	
		Center	Home-based	Mixed	Early	Later	Other	Strong Full	Not Strong or Not Full	Yes	No
Race/Ethnicity											
White nonhispanic	36	29	39	39	58	22	28	64	29	53	25
Black nonhispanic	34	45	28	35	23	33	50	21	39	23	43
Hispanic	24	22	29	21	14	41	16	11	27	19	28
Other	5	5	4	6	5	4	6	3	5	5	5
Primary Language											
English	79	81	74	83	89	66	81	90	75	86	73
Other	21	19	26	17	11	34	19	10	25	14	27
Age of Child at Enrollment											
Unborn	24	12	25	32	28	25	20	24	26	23	26
0-4 months	36	32	36	38	31	41	38	35	35	31	39
5-12 months	40	56	38	31	41	35	45	41	39	46	36
Child's Birth Order											
Firstborn	63	68	61	62	57	65	67	57	64	63	63
Later-Born	37	33	39	38	43	35	33	43	36	37	37
Mother's Age When Child Was Born											
Under 20	39	42	36	42	35	42	42	35	40	35	43
20 or older	61	59	64	58	65	58	58	65	60	65	57
Child's Gender											
Female	49	48	49	50	51	49	47	50	49	50	48
Male	51	53	51	50	50	51	53	50	51	50	52
Family Was Receiving AFDC/TANF Cash Assistance											
Yes	35	26	39	37	32	34	40	26	38	27	41
No	65	74	61	63	68	66	60	74	62	73	59
Primary Occupation											
Employed	23	33	22	19	26	23	21	25	23	31	18
In school or training	22	28	18	23	19	22	26	19	23	19	24
Other	54	39	61	57	55	56	53	56	54	50	58
Highest Grade Completed											
Less than 12th grade	48	46	50	48	39	61	44	39	51	39	55
12th grade or GED	28	29	28	29	33	22	30	33	27	32	26
More than 12th grade	24	26	22	24	28	17	25	28	22	29	20
Living Arrangements											
With spouse	25	19	29	24	29	23	22	35	22	28	23
With other adults	40	44	30	48	39	48	30	34	40	40	39
Alone	35	38	41	27	32	29	47	31	38	31	38
Number of Material Risk Factors											
0-1	18	20	17	18	23	13	18	25	16	23	14
2-3	55	57	56	54	56	56	54	55	56	56	55
4-5	27	23	27	28	22	31	28	20	28	20	31

Source: Head Start Family Information System application and enrollment forms.

TABLE E.IV.3

IMPACTS ON SERVICE RECEIPT DURING THE FIRST 28 MONTHS, BY PROGRAM APPROACH IN 1997

	Center-Based Programs			Mixed-Approach Programs			Home-Based Programs		
	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant
Any Services									
Any Key Services***[a,b]	92.6	85.5	7.1**	97.3	80.7	16.6***	96.0	80.1	15.9***
Any Home Visits or Center-Based Child Care***	86.8	63.7	23.1***	94.8	62.0	32.8***	94.2	51.3	42.9***
More Than 1 Home Visit or 2 Weeks Center-Based Child Care***	84.3	56.5	27.7***	93.7	55.9	37.8***	93.6	46.3	47.3***
Home Visits or Center Care at Required Intensity in at Least 1 Followup***	59.7	27.0	32.7***	80.4	14.6	65.7***	76.8	5.0	71.8***
Home Visits or Center Care at Required Intensity in All 3 Followups***	28.1	10.1	18.0***	29.8	4.1	25.7***	30.4	0.1	30.3***
Home Visits									
Any Home Visits***	72.6	23.3	49.3***	89.7	41.5	48.2***	92.9	33.3	59.7***
Any Child Development Services During Home Visits***	70.4	20.8	49.5***	88.3	43.3	45.1***	87.3	41.8	45.5***
Weekly Home Visits, 1st Follow-Up Period***	4.6	3.5	1.1	53.9	3.0	50.9***	62.4	2.3	60.0***
Weekly Home Visits, 2nd Follow-Up Period***	2.1	1.9	0.1	37.0	2.6	34.3***	53.2	1.9	51.2***
Weekly Home Visits, 3rd Follow-Up Period***	3.0	2.6	0.4	28.1	2.8	25.3***	43.4	2.3	41.0***
Weekly Home Visits in At Least 1 Followup***	7.8	4.6	3.3	66.2	5.5	60.7***	76.8	5.0	71.8***
Weekly Home Visits in All 3 Followups***	0.4	1.6	-1.3	17.0	0.6	16.4***	30.4	0.1	30.3***
Child Care									
Any Child Care***	93.6	89.3	4.3	89.8	78.6	11.2***	78.7	76.3	2.4
Any Center-Based Child Care***	78.7	52.5	26.2***	52.2	34.5	17.7***	32.3	27.0	5.3*
Average Hours per Week of Center-Based Care***	13.5	6.8	6.7***	5.4	2.6	2.8***	2.6	1.6	1.0**
Concurrent Child Care Arrangements***	72.8	62.3	10.6**	52.1	39.0	13.1***	38.2	41.0	-2.8
Average Weekly Out-of-Pocket Cost of Care***	$3.70	$10.89	-$7.19***	$5.55	$8.34	-$2.79*	$4.08	$3.82	0.3
Received a Child Care Subsidy***	16.3	34.1	-17.8***	28.4	27.6	0.9	36.5	36.7	-0.2
Child was in Care at 12 Months of Age***	88.7	78.1	10.6**	63.8	44.9	18.9***	55.9	53.6	2.3
Child was in Care at 24 Months of Age***	81.2	75.3	6.0	66.3	48.6	17.7***	49.0	46.2	2.7
Case Management									
Any Case Management Meetings***	73.5	58.3	15.2***	91.5	55.0	36.4***	90.3	54.3	36.0***
Weekly Case Management, 1st Follow-Up Period***	16.7	9.7	7.0*	49.9	7.4	42.5***	59.2	10.6	48.6***
Weekly Case Management, 2nd Follow-Up Period***	10.7	5.0	5.7**	37.5	5.8	31.8***	45.5	4.0	41.5***
Weekly Case Management, 3rd Follow-Up Period***	6.1	2.5	3.7*	30.7	5.7	25.0***	39.9	4.9	35.0***

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TABLE E.IV.3 (*continued*)

	Center-Based Programs			Mixed-Approach Programs			Home-Based Programs		
	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant
Group Activities									
Any Group Parenting Activities***	68.3	37.7	30.6***	70.3	38.5	31.8***	73.1	35.8	37.3***
Any Parent-Child Group Activities***	30.0	13.5	16.5***	45.3	17.4	27.9***	45.3	11.5	33.8***
Early Intervention Services									
Identification of Child's Disability***	8.4	4.9	3.5	6.4	6.4	-0.0	7.6	5.0	2.7*
Services for Child with Disability***	5.4	2.4	3.0	3.4	4.1	-0.7	5.3	3.7	1.5
Child Health Services									
Any Child Health Services***	100.0	100.0	0.0	100.0	99.6	0.5	100.0	99.8	0.2
Any Doctor Visits***	99.1	99.5	-0.5	98.9	97.0	1.9*	99.0	98.7	0.3
Any Emergency Room Visits***	56.0	56.3	-0.4	54.1	48.3	5.8	53.4	56.0	-2.6
Number of Emergency Room Visits for Injuries	0.2	0.3	-0.1	0.2	0.2	-0.0	0.3	0.3	-0.0
Any Dentist Visits***	38.4	32.8	5.6	23.2	19.3	3.9	27.1	28.1	-1.0
Any Screening Tests***	69.3	68.6	0.7	71.1	70.6	0.5	62.4	61.0	1.4
Any Immunizations***	97.8	97.4	0.4	98.7	97.6	1.1	99.1	98.5	0.7
Family Development Services									
Any Education-Related Services***	83.3	66.1	17.2***	91.8	61.4	30.3***	86.9	50.8	36.1***
Any Employment-Related Services***	68.0	43.5	24.5***	81.9	47.6	34.4***	77.3	47.1	30.2***
Any Family Health Services[c]	100.0	100.0	0.0	100.0	100.0	0.0	100.0	100.0	0.0
Any Family Mental Health Services***	19.8	14.7	5.1	23.7	25.9	-2.2	23.9	21.0	2.9
Transportation Assistance***	27.3	22.5	4.8	38.1	22.1	15.9***	32.0	23.9	8.1***
Housing Assistance***	56.1	44.7	11.4**	51.3	55.5	-4.3	65.7	64.1	1.6
Sample Size	**230**	**204**	**434**	**358**	**354**	**712**	**488**	**453**	**941**

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally.

[a] Home visits, case management, center-based child care, and/or group parenting activities.

[b] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

[c] There is no variance across subgroups due to lack of variance in level of services.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE E.IV.4

IMPACTS ON SERVICE RECEIPT DURING THE FIRST 28 MONTHS, BY PATTERN OF IMPLEMENTATION

	Early Implementers			Later Implementers			Incomplete Implementers		
	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant
Any Services									
Any Key Services***,b	99.4	70.6	25.8***	96.3	81.3	15.1***	90.5	78.1	12.5***
Any Home Visits or Center-Based Child Care***	97.7	59.8	37.9***	92.1	58.4	33.7***	87.8	55.0	32.9***
More Than 1 Home Visit or 2 Weeks Center-Based Child Care***	96.4	53.7	42.7***	91.2	51.4	39.8***	87.0	49.7	37.3***
Home Visits or Center Care at Required Intensity in at Least 1 Followup***	86.3	17.0	69.3***	69.2	13.0	56.2***	65.8	9.1	56.8***
Home Visits or Center Care at Required Intensity in All 3 Followups***	41.7	4.0	37.7***	26.3	3.8	22.5***	21.7	1.1	20.6***
Home Visits									
Any Home Visits***	91.9	35.1	56.8***	87.4	36.2	51.3***	80.0	30.4	49.6***
Any Child Development Services During Home Visits***	91.3	33.1	58.3***	85.6	35.0	50.6***	80.1	25.7	54.4***
Weekly Home Visits, 1st Follow-Up Period***	53.5	2.6	50.9***	38.1	4.1	34.0***	44.9	2.4	42.5***
Weekly Home Visits, 2nd Follow-Up Period***	40.4	2.8	37.6***	33.7	2.4	31.3***	30.9	1.7	29.2***
Weekly Home Visits, 3rd Follow-Up Period***	29.5	2.4	27.0***	32.6	1.8	30.8***	23.5	2.5	21.1***
Weekly Home Visits in at Least 1 Followup***	59.5	5.5	54.0***	55.5	6.0	49.5***	54.8	3.8	50.9***
Weekly Home Visits in All 3 Followups***	24.4	0.3	24.1***	16.6	0.6	16.0***	15.0	0.1	15.0***
Child Care									
Any Child Care***	87.6	80.7	6.9**	81.3	76.8	4.5	90.4	83.2	7.2**
Any Center-Based Child Care***	56.0	35.8	20.2***	49.2	34.4	14.8***	45.6	35.9	9.7**
Average Hours per Week of Center-Based Care*	7.9	3.6	4.2***	5.1	3.1	2.0***	5.4	2.6	2.9***
Concurrent Child Care Arrangements***	56.7	48.8	7.9*	48.1	39.9	8.2**	48.9	47.1	1.9
Average Weekly Out-of-Pocket Cost of Care	$4.09	$7.33	-$3.23**	$3.53	$6.10	-$2.57***	$6.06	$8.08	- $2.02
Received a Child Care Subsidy***	26.3	30.8	-4.5	27.2	30.9	-3.7	36.1	35.5	0.6
Child was in Care at 12 Months of Age***	68.4	53.0	15.4***	60.1	58.9	5.1	74.2	54.6	14.6***
Child was in Care at 24 Months of Age	64.2	58.2	6.0	56.5	44.5	12.1***	69.9	58.6	11.3**
Case Management									
Any Case Management Meetings***	91.4	67.0	24.4***	85.4	51.8	33.6***	82.2	46.9	35.2***
Weekly Case Management, 1st Follow-Up Period***	54.3	10.0	44.3***	35.8	9.4	26.3***	47.6	8.6	39.0***
Weekly Case Management, 2nd Follow-Up Period***	42.0	6.4	35.6***	27.8	4.6	23.3***	31.7	5.1	26.6***
Weekly Case Management, 3rd Follow-Up Period***	32.9	6.5	26.4***	29.9	3.3	26.6***	22.5	3.6	18.9***

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TABLE E.IV.4 *(continued)*

	Early Implementers			Later Implementers			Incomplete Implementers		
	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant
Group Activities									
Any Group Parenting Activities***	76.9	44.0	32.9***	68.7	30.9	37.9***	65.9	37.6	28.3***
Any Parent-Child Group Activities***	43.8	19.8	24.0***	46.0	8.1	37.9***	33.1	15.7	17.3***
Early Intervention Services									
Identification of Child's Disability***	6.3	7.2	-0.9	6.5	4.3	2.2	9.3	5.2	4.1*
Services for Child with Disability***	4.2	4.3	-0.1	3.4	2.6	0.8	6.5	4.0	2.5
Child Health Services									
Any Child Health Services***	100.0	100.0	0.0	100.0	99.5	0.5	100.0	100.0	0.0
Any Doctor Visits***	99.7	99.6	0.1	98.0	96.7	1.4	98.9	99.2	-0.3
Any Emergency Room Visits***	60.3	54.6	5.6	46.4	49.3	-2.9	55.6	57.5	-1.9
Number of Emergency Room Visits for Injuries	0.3	0.3	-0.0	0.1	0.2	-0.1*	0.3	0.3	-0.1
Any Dentist Visits***	32.2	24.2	8.0**	27.9	24.7	3.3	24.9	29.4	-4.5
Any Screening Tests***	64.4	62.1	2.3	64.3	64.4	-0.1	74.1	72.8	1.3
Any Immunizations***	99.0	97.4	1.6	98.1	97.6	0.5	99.2	98.5	0.7
Family Development Services									
Any Education-Related Services***	87.6	61.9	25.8***	83.9	55.6	28.4***	90.4	59.0	31.5***
Any Employment-Related Services***	77.2	48.8	28.5***	74.5	41.6	33.0***	78.9	49.3	29.6***
Any Family Health Services[c]	100.0	100.0	0.0	100.0	100.0	0.0	100.0	100.0	0.0
Any Family Mental Health Services***	30.3	27.5	2.8	17.1	16.2	0.9	20.0	20.8	-0.8
Transportation Assistance***	34.3	22.0	12.3***	34.8	19.2	15.5***	30.6	27.2	3.3
Housing Assistance***	58.1	56.5	1.6	49.9	47.6	2.3	68.3	67.8	0.4
Sample Size	366	367	733	410	374	784	300	270	570

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally.

[a] Home visits, case management, center-based child care, and/or group parenting activities.

[b] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

[c] There is no variance across subgroups due to lack of variance in level of services.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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TABLE E.IV.5

IMPACTS ON SERVICE RECEIPT DURING THE FIRST 28 MONTHS, BY IMPLEMENTATION STATUS OF MIXED APPROACH PROGRAMS

	Early Implementers				Late or Incomplete Implementers		
	Program Group	Control Group	Impact Estimate per Eligible Applicant		Program Group	Control Group	Impact Estimate per Eligible Applicant
Any Services							
Any Key Services***[a,b]	98.6	79.1	19.6***		96.7	81.7	15.0***
Any Home Visits or Center-Based Child Care***	95.0	62.7	32.4***		93.3	62.8	30.5***
More Than 1 Home Visit or 2 Weeks Center-Based Child Care***	93.2	58.2	35.0***		93.1	54.9	38.2***
Home Visits or Center Care at Required Intensity in at Least 1 Followup***	85.9	11.2	74.7***		71.9	20.8	51.1***
Home Visits or Center Care at Required Intensity in All 3 Followups***	31.2	3.7	27.5***		26.6	6.6	20.0***
Home Visits							
Any Home Visits***	93.1	49.1	43.9***		85.1	35.1	50.0***
Any Child Development Services During Home Visits***	91.0	48.0	43.0***		86.2	34.2	52.0***
Weekly Home Visits, 1st Follow-Up Period***	72.0	2.6	69.5***		35.4	3.9	31.6***
Weekly Home Visits, 2nd Follow-Up Period***	51.6	3.8	47.8***		20.7	3.3	17.5***
Weekly Home Visits, 3rd Follow-Up Period***	31.8	3.8	27.9***		23.4	2.9	20.5***
Weekly Home Visits in at Least 1 Followup***	81.1	6.2	74.9***		50.0	5.9	44.1***
Weekly Home Visits in All 3 Followups***	25.0	0.7	24.3***		8.2	1.3	7.0***
Child Care							
Any Child Care***	85.9	73.1	12.8**		94.8	83.0	11.7***
Any Center-Based Child Care***	43.6	29.3	14.3**		60.1	40.4	19.7***
Average Hours per Week of Center-Based Care	3.1	1.7	1.4		7.5	3.6	3.9***
Concurrent Child Care Arrangements***	43.8	34.1	9.7		61.0	43.2	17.7***
Average Weekly Out-of-Pocket Cost of Care	$6.64	$5.84	$0.81		$4.21	$11.12	-$6.91***
Received a Child Care Subsidy***	31.0	29.7	1.3		26.9	24.5	2.4
Child was in Care at 12 Months of Age**	53.9	36.2	17.8**		74.6	52.8	21.9***
Child was in Care at 24 Months of Age**	59.3	42.9	16.4**		72.8	53.8	19.0***
Case Management							
Any Case Management Meetings***	93.3	64.5	28.9***		88.9	46.5	42.4***
Weekly Case Management, 1st Follow-Up Period***	62.5	10.0	52.5***		38.1	4.1	34.0***
Weekly Case Management, 2nd Follow-Up Period***	49.1	6.5	42.6***		23.7	7.5	16.2***
Weekly Case Management, 3rd Follow-Up Period***	34.5	9.0	25.5***		25.4	3.9	21.5***
Group Activities							
Any Group Parenting Activities***	65.3	41.6	23.7***		74.5	36.5	37.9***
Any Parent-Child Group Activities**	38.9	23.4	15.6***		49.8	13.4	36.3***

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TABLE E.IV.5 *(continued)*

	Early Implementers			Late or Incomplete Implementers		
	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant
	Early Intervention Services					
Identification of Child's Disability***	3.1	6.3	-3.2	9.8	6.4	3.4
Services for Child with Disability***	1.6	3.6	-2.0	5.4	4.5	0.9
	Child Health Services					
Any Child Health Services***	100.0	100.0	0.0	99.9	99.5	0.4
Any Doctor Visits***	100.0	99.0	1.1	97.9	94.8	3.2
Any Emergency Room Visits***	61.3	46.0	15.4**	48.3	49.4	-1.1
Number of Emergency Room Visits for Injuries	0.3	0.2	0.0	0.1	0.2	-0.1
Any Dentist Visits***	20.6	17.6	3.1	25.8	20.9	5.0
Any Screening Tests***	76.9	76.9	0.0	65.0	64.6	0.4
Any Immunizations***	99.5	97.4	2.1	97.4	98.3	-1.0
	Family Development Services					
Any Education-Related Services***	88.8	56.7	32.1***	94.3	66.6	27.7***
Any Employment-Related Services***	81.9	58.7	23.2***	83.1	35.2	47.9***
Any Family Health Services[c]	100.0	100.0	0.0	100.0	100.0	0.0
Any Family Mental Health Services***	32.0	34.2	-2.2	14.0	19.2	-5.2
Transportation Assistance***	43.9	23.9	19.9***	32.3	20.3	12.1**
Housing Assistance***	59.4	62.1	-2.7	42.8	49.2	-6.4
Sample Size	**180**	**195**	**375**	**178**	**159**	**367**

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroups are included in the estimates for each subgroup.

[a] Home visits, case management, center-based child care, and/or group parenting activities.

[b] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups in the first two columns.

[c] There is no variance across subgroups due to lack of variance in level of services.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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TABLE E.IV.6

IMPACTS ON SERVICE RECEIPT DURING THE FIRST 28 MONTHS, BY IMPLEMENTATION STATUS OF HOME-BASED PROGRAMS

	Early or Late Implementers			Incomplete Implementers		
	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant
Any Services						
Any Key Services***,a,b	96.7	81.4	15.2***	94.6	78.7	15.9***
Any Home Visits or Center-Based Child Care***	95.7	73.3	22.4***	94.6	72.4	22.2***
More Than 1 Home Visit or 2 Weeks Center-Based Child Care***	94.2	50.6	43.7***	94.5	51.9	42.6***
Home Visits or Center Care at Required Intensity in at Least 1 Followup***	80.4	5.9	74.5***	73.5	2.2	71.3***
Home Visits or Center Care at Required Intensity in All 3 Followups***	36.9	-0.2	37.1***	23.2	-1.1	24.3***
Home Visits						
Any Home Visits***	93.4	33.8	59.6***	92.6	32.5	60.1***
Any Child Development Services During Home Visits***	92.2	30.6	61.6***	92.7	28.9	63.8***
Weekly Home Visits, 1st Follow-Up Period***	63.9	3.2	60.8***	61.8	-0.5	62.2***
Weekly Home Visits, 2nd Follow-Up Period***	60.7	2.3	58.5***	43.1	1.5	41.6***
Weekly Home Visits, 3rd Follow-Up Period***	51.9	1.7	50.2***	33.7	1.3	32.5***
Weekly Home Visits in at Least 1 Followup***	80.4	5.9	74.5***	73.5	2.2	71.3***
Weekly Home Visits in All 3 Followups***	36.9	-0.2	37.1***	23.2	-1.1	24.3***
Child Care						
Any Child Care***	71.0	71.0	0.0	90.3	81.9	8.3**
Any Center-Based Child Care***	27.2	25.6	1.6	40.4	27.6	12.7**
Average Hours per Week of Center-Based Care	2.0	1.8	0.6	3.7	1.5	2.2***
Concurrent Child Care Arrangements***	32.3	35.5	-3.2	46.6	47.8	-1.3
Average Weekly Out-of-Pocket Cost of Care	$2.77	$2.59	$0.19	$5.71	$5.61	$0.10
Received a Child Care Subsidy***	22.0	28.8	-6.7	56.1	45.9	9.2
Child was in Care at 12 Months of Age***	43.4	45.7	-2.2	73.3	63.5	9.8*
Child was in Care at 24 Months of Age***	32.9	36.3	-3.4	69.4	60.7	8.7
Case Management						
Any Case Management Meetings***	88.1	55.3	32.8***	93.4	52.7	40.7***
Weekly Case Management, 1st Follow-Up Period***	57.7	12.5	45.3***	61.4	7.9	53.6***
Weekly Case Management, 2nd Follow-Up Period***	48.8	4.8	44.0***	41.4	2.6	38.8***
Weekly Case Management, 3rd Follow-Up Period***	47.9	5.2	42.7***	29.8	3.7	26.1***
Group Activities						
Any Group Parenting Activities***	75.6	37.1	38.6***	70.6	33.1	37.5***
Any Parent-Child Group Activities**	58.2	9.7	48.5***	29.1	13.1	16.0***

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TABLE E.IV.6 (*continued*)

	Early or Late Implementers			Incomplete Implementers		
	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant
Early Intervention Services						
Identification of Child's Disability***	8.7	5.2	3.5*	6.5	4.3	2.2
Services for Child with Disability***	5.9	4.1	1.8	4.8	2.9	1.9
Child Health Services						
Any Child Health Services***	99.9	99.8	0.2	100.0	100.0	0.0
Any Doctor Visits***	98.3	98.0	0.3	99.9	99.6	0.3
Any Emergency Room Visits***	45.0	51.3	-6.2	64.3	62.6	1.7
Number of Emergency Room Visits for Injuries	0.2	0.3	-0.1***	0.4	0.3	0.1
Any Dentist Visits***	28.6	29.5	-0.9	23.9	27.4	-3.5
Any Screening Tests***	57.8	54.9	3.0	67.7	69.9	-2.3
Any Immunizations***	99.3	98.7	0.6	99.0	98.1	0.9
Family Development Services						
Any Education-Related Services***	83.6	49.7	33.9***	92.3	50.8	41.6***
Any Employment-Related Services***	70.3	38.1	32.2***	86.2	59.5	26.7***
Any Family Health Services[c]	100.0	100.0	0.0	100.0	100.0	0.0
Any Family Mental Health Services***	24.4	20.2	4.2	22.5	22.7	-0.2
Transportation Assistance***	31.6	14.7	16.9***	33.8	34.9	-1.0
Housing Assistance***	54.6	50.7	3.9	81.6	80.8	0.8
Sample Size	**287**	**276**	**563**	**201**	**177**	378

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroups are included in the estimates for each subgroup.

[a] Home visits, case management, center-based child care, and/or group parenting activities.

[b] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups in the first two columns.

[c] There is no variance across subgroups due to lack of variance in level of services.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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TABLE E.IV.7

IMPACTS ON SERVICE RECEIPT DURING THE FIRST 28 MONTHS, BY IMPLEMENTATION STATUS OF ALL SERVICES

	Strong Full Implementation			Not Strong or Not Full Implementation		
	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant
Any Services						
Any Key Services***[a,b]	99.3	82.4	16.8***	94.7	81.2	13.5***
Any Home Visits or Center-Based Child Care***	99.2	80.4	18.8***	93.2	75.0	18.2***
More Than 1 Home Visit or 2 Weeks Center-Based Child Care***	96.6	56.5	40.0***	91.6	58.4	33.3***
Home Visits or Center Care at Required Intensity in at Least 1 Followup***	87.9	12.8	75.0***	69.8	13.7	56.1***
Home Visits or Center Care at Required Intensity in All 3 Followups***	45.7	2.7	42.9***	25.7	3.1	22.7***
Home Visits						
Any Home Visits***	94.0	34.5	59.4***	85.0	33.5	51.4***
Any Child Development Services During Home Visits***	92.6	32.0	60.6***	84.1	31.3	52.8***
Weekly Home Visits, 1st Follow-Up Period***	62.0	2.0	60.0***	40.3	3.6	36.8***
Weekly Home Visits, 2nd Follow-Up Period***	50.5	3.1	47.5***	30.8	1.9	29.0***
Weekly Home Visits, 3rd Follow-Up Period***	38.3	1.5	36.9***	26.1	2.3	23.8***
Weekly Home Visits in at Least 1 Followup***	69.1	4.4	64.8***	53.0	5.3	47.6***
Weekly Home Visits in All 3 Followups***	32.7	-0.4	33.1***	14.7	0.5	14.2***
Child Care						
Any Child Care***	83.6	78.2	5.4	86.6	81.0	5.7***
Any Center-Based Child Care***	47.1	29.6	17.5***	51.3	37.5	13.8***
Average Hours per Week of Center-Based Care	5.1	2.9	2.3***	6.4	3.3	3.1***
Concurrent Child Care Arrangements***	52.6	42.3	10.3**	51.6	45.4	6.2**
Average Weekly Out-of-Pocket Cost of Care	$4.54	$5.52	-$0.99	$4.39	$7.66	-$3.28***
Received a Child Care Subsidy***	21.2	22.4	-1.2	32.0	35.3	-1.3
Child was in Care at 12 Months of Age***	62.7	49.8	12.9*	68.2	55.9	11.3***
Child was in Care at 24 Months of Age***	55.2	49.1	6.1	64.6	54.3	10.3***
Case Management						
Any Case Management Meetings***	96.1	67.1	29.1***	84.3	51.6	32.7***
Weekly Case Management, 1st Follow-Up Period***	68.4	8.8	59.7***	39.5	8.9	30.6***
Weekly Case Management, 2nd Follow-Up Period***	53.6	5.6	48.0***	28.4	4.8	23.6***
Weekly Case Management, 3rd Follow-Up Period***	43.8	5.4	38.4***	24.5	3.9	20.6***
Group Activities						
Any Group Parenting Activities***	71.6	40.5	31.1***	70.5	36.5	34.0***
Any Parent-Child Group Activities**	47.2	22.0	25.1***	39.3	12.5	26.8***

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TABLE E.IV.7 *(continued)*

	Strong Full Implementation				Not Strong or Not Full Implementation		
	Program Group	Control Group	Impact Estimate per Eligible Applicant		Program Group	Control Group	Impact Estimate per Eligible Applicant
Early Intervention Services							
Identification of Child's Disability***	7.4	8.0	-0.6		7.2	4.9	2.3**
Services for Child with Disability***	4.4	5.7	-1.3		4.5	3.1	1.5
Child Health Services							
Any Child Health Services***	100.0	100.0	0.0		100.0	99.8	0.2
Any Doctor Visits***	99.4	99.5	-0.1		98.7	98.1	0.6
Any Emergency Room Visits***	61.0	53.8	7.2		51.9	53.5	-1.6
Number of Emergency Room Visits for Injuries	0.3	0.3	-0.0		0.2	0.3	-0.1
Any Dentist Visits***	29.8	22.3	7.5*		27.9	27.3	0.5
Any Screening Tests***	73.5	68.1	5.4		64.9	65.8	-0.9
Any Immunizations***	99.2	96.9	2.3*		98.7	98.1	0.6
Family Development Services							
Any Education-Related Services***	88.3	56.3	32.0***		87.3	59.0	28.3***
Any Employment-Related Services***	79.0	48.7	30.4***		76.2	45.6	30.5***
Any Family Health Services[c]	100.0	100.0	0.0		100.0	100.0	0.0
Any Family Mental Health Services***	25.2	21.3	3.9		19.4	20.3	-0.9
Transportation Assistance***	28.3	13.4	14.9***		34.7	25.6	9.1***
Housing Assistance***	57.1	58.7	-1.5		58.2	56.5	1.7
Sample Size	**255**	**254**	**509**		**821**	**757**	**1,578**

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroups are included in the estimates for each subgroup.

[a] Home visits, case management, center-based child care, and/or group parenting activities.

[b] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups in the first two columns.

[c] There is no variance across subgroups due to lack of variance in level of services.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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TABLE E.IV.8

IMPACTS ON SERVICE RECEIPT DURING THE FIRST 28 MONTHS, BY WORK REQUIREMENTS FOR MOTHERS RECEIVING AFDC/TANF

	Mothers of Children Under 1 Required to Work			Mothers of Children Under 1 Not Required to Work		
	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant
Any Services						
Any Key Services***[a,b]	97.5	88.2	9.3***	94.5	77.0	17.5***
Any Home Visits or Center-Based Child Care***	95.0	58.1	36.9***	91.1	58.0	33.1***
More Than 1 Home Visit or 2 Weeks Center-Based Child Care***	93.5	50.8	42.7***	90.4	52.7	37.7***
Home Visits or Center Care at Required Intensity in at Least 1 Followup***	79.3	18.0	61.3***	69.0	11.9	57.1***
Home Visits or Center Care at Required Intensity in All 3 Followups***	40.4	4.7	35.7***	22.4	3.0	19.5***
Home Visits						
Any Home Visits***	89.2	30.9	58.3***	85.6	35.9	49.8***
Any Child Development Services During Home Visits***	88.0	28.4	59.6***	84.9	33.6	51.3***
Weekly Home Visits, 1st Follow-Up Period***	45.2	4.5	40.7***	45.1	2.8	42.3***
Weekly Home Visits, 2nd Follow-Up Period***	36.9	2.8	34.0***	34.0	2.1	31.8***
Weekly Home Visits, 3rd Follow-Up Period***	29.1	3.0	26.2***	28.0	2.2	25.8***
Weekly Home Visits in at Least 1 Followup***	51.2	6.3	45.0***	60.0	5.0	55.0***
Weekly Home Visits in All 3 Followups***	23.5	1.4	22.1***	15.0	0.4	14.6***
Child Care						
Any Child Care***	87.5	83.5	4.0*	84.6	78.4	6.3***
Any Center-Based Child Care***	53.9	37.0	16.9***	47.9	34.5	13.5***
Average Hours per Week of Center-Based Care	8.0	3.9	4.1***	4.8	2.7	2.1***
Concurrent Child Care Arrangements***	61.1	56.7	4.4	44.4	37.2	7.3**
Average Weekly Out-of-Pocket Cost of Care	$4.01	$8.18	-$4.17***	$4.60	$6.60	-$2.00**
Received a Child Care Subsidy***	25.1	31.7	-6.6*	31.7	33.7	-2.0
Child was in Care at 12 Months of Age***	72.6	65.2	7.4**	62.3	50.0	12.3**
Child was in Care at 24 Months of Age***	65.1	61.6	3.5	60.6	49.1	11.5***
Case Management						
Any Case Management Meetings***	90.8	70.6	20.3***	84.2	44.7	39.5***
Weekly Case Management, 1st Follow-Up Period***	51.4	12.7	38.8***	42.4	6.4	36.0***
Weekly Case Management, 2nd Follow-Up Period***	41.3	6.3	34.9***	29.5	4.1	25.4***
Weekly Case Management, 3rd Follow-Up Period***	33.5	5.9	27.7***	25.3	3.7	21.6***
Group Activities						
Any Group Parenting Activities***	73.1	38.2	34.9***	69.0	37.1	31.9***
Any Parent-Child Group Activities**	40.8	14.4	26.3***	41.9	14.4	27.4***

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TABLE E.IV.8 (*continued*)

	Mothers of Children Under 1 Required to Work			Mothers of Children Under 1 Not Required to Work		
	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant
Early Intervention Services						
Identification of Child's Disability***	10.4	7.6	2.9	5.1	4.1	1.0
Services for Child with Disability***	6.7	4.6	2.2	3.2	2.8	0.4
Child Health Services						
Any Child Health Services***	100.0	99.8	0.2	100.0	99.8	0.2
Any Doctor Visits***	99.6	99.6	-0.0	98.6	97.4	1.2
Any Emergency Room Visits***	61.1	57.5	3.6	49.5	50.4	-1.0
Number of Emergency Room Visits for Injuries	0.3	0.3	-0.0	0.2	0.2	-0.0
Any Dentist Visits***	33.4	26.2	7.2**	24.9	26.0	-1.1
Any Screening Tests***	59.2	59.8	-0.6	72.1	71.2	1.0
Any Immunizations***	98.7	97.7	1.0	98.8	97.9	1.0
Family Development Services						
Any Education-Related Services***	87.6	63.9	23.7***	86.8	55.2	31.7***
Any Employment-Related Services***	78.1	48.4	29.6***	75.9	44.9	31.0***
Any Family Health Services[c]	100.0	100.0	0.0	100.0	100.0	0.0
Any Family Mental Health Services***	28.1	21.1	6.9**	18.9	21.5	-2.7
Transportation Assistance***	32.4	25.0	7.4**	33.4	21.5	11.9***
Housing Assistance***	57.7	51.8	5.9*	58.4	60.3	-1.8
Sample Size	**468**	**438**	**906**	**608**	**573**	**1,181**

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroups are included in the estimates for each subgroup.

[a] Home visits, case management, center-based child care, and/or group parenting activities.

[b] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups in the first two columns.

[c] There is no variance across subgroups due to lack of variance in level of services.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

AFDC = Aid to Families with Dependent Children
TANF = Temporary Assistance for Needy Families

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TABLE E.IV.9

IMPACTS ON SERVICE RECEIPT DURING THE FIRST 28 MONTHS, BY WHETHER PROGRAM IS LOCATED IN AN URBAN AREA

	Urban Sites			Rural or Non-Urban Sites		
	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant
Any Services						
Any Key Services***[a,b]	94.4	78.4	16.0***	98.4	89.5	8.9***
Any Home Visits or Center-Based Child Care***	92.2	56.3	35.9***	94.4	61.6	32.8***
More Than 1 Home Visit or 2 Weeks Center-Based Child Care***	91.2	50.8	40.3***	93.6	53.7	39.9***
Home Visits or Center Care at Required Intensity in at Least 1 Followup***	73.1	11.8	61.3***	75.1	19.0	56.1***
Home Visits or Center Care at Required Intensity in All 3 Followups***	26.3	1.8	24.4***	39.1	7.4	31.7***
Home Visits						
Any Home Visits***	86.4	34.3	52.1***	88.6	32.5	56.1***
Any Child Development Services During Home Visits***	85.6	31.0	54.5***	87.6	32.4	55.2***
Weekly Home Visits, 1st Follow-Up Period***	47.9	3.5	44.4***	39.3	2.7	36.6***
Weekly Home Visits, 2nd Follow-Up Period***	35.2	2.6	32.6***	34.7	2.5	32.2***
Weekly Home Visits, 3rd Follow-Up Period***	27.3	2.5	24.8***	32.1	2.1	29.9***
Weekly Home Visits in at Least 1 Followup***	59.2	5.7	53.5***	49.7	5.1	44.7***
Weekly Home Visits in All 3 Followups***	17.1	0.5	16.7***	22.1	1.2	20.9***
Child Care						
Any Child Care***	87.1	80.8	6.3***	83.5	78.9	4.6
Any Center-Based Child Care***	46.3	33.7	12.6***	60.0	39.9	20.1***
Average Hours per Week of Center-Based Care	5.6	2.4	3.2***	7.6	4.6	3.0***
Concurrent Child Care Arrangements***	48.8	43.8	5.0*	56.9	49.1	7.8*
Average Weekly Out-of-Pocket Cost of Care	$5.27	$7.73	-$2.46***	$2.34	$5.86	-$3.51***
Received a Child Care Subsidy***	32.0	34.5	-2.5	24.1	26.3	-2.1
Child was in Care at 12 Months of Age***	67.0	53.3	13.7***	66.4	62.1	4.3
Child was in Care at 24 Months of Age***	63.0	52.9	10.1***	62.1	56.3	5.8
Case Management						
Any Case Management Meetings***	85.5	53.1	32.4***	89.7	61.3	28.4***
Weekly Case Management, 1st Follow-Up Period***	47.9	9.8	38.1***	41.8	7.2	34.6***
Weekly Case Management, 2nd Follow-Up Period***	35.4	5.8	29.6***	29.7	5.1	24.6***
Weekly Case Management, 3rd Follow-Up Period***	26.3	5.2	21.1***	34.6	3.1	31.5***
Group Activities						
Any Group Parenting Activities***	68.2	35.3	32.9***	77.5	42.1	35.4***
Any Parent-Child Group Activities**	37.8	15.5	22.3***	50.8	11.1	39.7***

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TABLE E.IV.9 *(continued)*

	Urban Sites				Rural or Non-Urban Sites		
	Program Group	Control Group	Impact Estimate per Eligible Applicant		Program Group	Control Group	Impact Estimate per Eligible Applicant
Early Intervention Services							
Identification of Child's Disability***	7.2	5.7	1.5		7.2	5.5	1.7
Services for Child with Disability***	4.6	3.4	1.1		4.4	4.4	-0.0
Child Health Services							
Any Child Health Services***	100.0	99.9	0.1		100.0	99.5	0.5
Any Doctor Visits***	99.3	99.2	0.1		97.9	96.4	1.4
Any Emergency Room Visits***	55.3	55.1	0.2		50.6	50.2	0.4
Number of Emergency Room Visits for Injuries	0.2	0.3	-0.1		0.2	0.3	-0.0
Any Dentist Visits***	25.1	25.8	-0.7		35.9	27.0	8.9**
Any Screening Tests***	66.8	68.8	-2.0		66.9	60.9	6.0
Any Immunizations***	99.2	98.3	1.0		97.9	96.4	1.5
Family Development Services							
Any Education-Related Services***	87.7	58.4	29.3***		85.8	59.7	26.1***
Any Employment-Related Services***	77.4	48.4	29.0***		75.7	41.2	34.5***
Any Family Health Services[c]	100.0	100.0	0.0		100.0	100.0	0.0
Any Family Mental Health Services***	23.3	23.6	-0.3		20.0	17.0	3.0
Transportation Assistance***	35.8	26.2	9.6***		26.3	14.9	11.4***
Housing Assistance***	62.5	61.3	1.2		48.2	45.5	2.8
Sample Size	**741**	**720**	**1,461**		**335**	**291**	**626**

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroups are included in the estimates for each subgroup.

[a] Home visits, case management, center-based child care, and/or group parenting activities.

[b] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups in the first two columns.

[c] There is no variance across subgroups due to lack of variance in level of services.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

APPENDIX E.VI

TABLE E.VI.1

IMPACTS ON CHILD AND FAMILY OUTCOMES AT AGE 3, BY PROGRAM APPROACH IN 1997

	Center-Based Programs				Mixed-Approach Programs				Home-Based Programs			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Child Cognitive and Language Development												
Bayley Mental Development Index (MDI) Standard Score	89.8	88.9	0.9	7.2	89.3	87.9	1.4	10.9	94.1	92.8	1.2	9.5
Percentage with MDI < 85***[d]	26.5	36.1	-9.7	-20.7	36.1	38.4	-2.2	-4.8	20.5	22.0	-1.4	-3.1
Peabody Picture Vocabulary Test (PPVT)-III Standard Score	83.2	81.8	1.5	9.1	82.2	78.5	3.7**	22.6	84.6	83.1	1.5	9.1
Percentage with PPVT-III < 85***	52.4	54.7	-2.3	-4.5	56.0	67.7	-11.6**	-23.3	45.6	48.6	-3.0	-6.1
Child Social-Emotional Development												
Engagement of Parent During Parent-Child Semistructured Play	4.9	4.7	0.2	17.4	4.7	4.4	0.3***	29.5	4.8	4.6	0.2**	19.2
Sustained Attention with Objects During Parent-Child Semistructured Play	5.0	5.0	0.0	0.5	5.0	4.7	0.3***	30.8	5.0	4.9	0.1	10.6
Engagement of Parent During Parent-Child Puzzle Challenge Task	5.0	4.9	0.1	8.0	5.0	4.9	0.1	14.2	5.1	5.0	0.1	5.6
Persistence During Parent-Child Puzzle Challenge Task	4.4	4.3	0.1	9.1	4.5	4.4	0.0	3.5	4.7	4.6	0.1	12.0
Bayley Behavioral Rating Scale (BRS): Emotional Regulation	4.0	4.0	0.0	1.1	4.0	4.1	-0.1	-7.9	4.0	4.0	0.0	2.1
Bayley BRS: Orientation/ Engagement	3.9	3.9	0.1	9.6	3.9	3.9	-0.1	-9.5	3.9	3.8	0.0	3.4
Negativity Toward Parent During Parent-Child Semistructured Play	1.2	1.4	-0.2**	-27.1	1.3	1.3	-0.1	-15.3	1.3	1.3	-0.0	-6.6
Frustration During Parent-Child Puzzle Challenge Task	2.5	2.7	-0.2	-14.9	2.8	2.7	0.1	10.3	2.7	2.6	0.1	5.9
Child Behavior Checklist—Aggressive Behavior	9.6	10.8	-1.2	-18.1	10.7	11.3	-0.6	-9.3	11.2	11.7	-0.5	-7.8

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TABLE E.VI.1 *(continued)*

	Center-Based Programs				Mixed-Approach Programs				Home-Based Programs			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Child Health Status												
Child's Health Status	3.9	4.1	-0.2	-17.1	4.1	4.1	0.0	2.3	4.0	4.0	-0.0	-4.0
Percentage of Children in Fair or Poor Health***	9.9	6.7	3.2	11.1	5.4	6.0	-0.6	-2.1	9.8	9.6	0.2	0.8
Quality of the Home Environment and Parenting: Overall and Physical Environment												
Home Observation for Measurement of the Environment (HOME) Total Score	27.3	26.4	0.9	18.8	27.0	26.4	0.6	11.3	28.3	28.1	0.2	3.5
HOME Internal Physical Environment	7.7	7.5	0.1	8.6	7.7	7.8	-0.1	-3.7	8.0	8.0	-0.0	-1.6
Parenting Behavior: Emotional Support												
HOME Warmth	2.6	2.4	0.1	15.4	2.4	2.3	0.1	9.3	2.7	2.7	-0.0	-0.8
Supportiveness During Parent-Child Semistructured Play	4.1	4.0	0.1	8.9	4.0	3.8	0.2**	20.8	4.0	3.9	0.1**	15.5
Supportive Presence During Parent-Child Puzzle Challenge Task	4.5	4.5	-0.1	-4.2	4.4	4.2	0.2	14.7	4.6	4.5	0.1	7.3
Parenting Behavior: Stimulation of Language and Learning												
Percentage of Children with a Regular Bedtime***	58.7	57.0	1.8	3.6	59.3	62.4	-3.1	-6.2	59.3	55.6	3.6	7.4
Percentage of Children Who Follow a Bedtime Routine*	67.1	66.1	1.0	2.2	67.9	66.8	1.1	2.4	72.0	71.0	1.0	2.2
HOME: Support of Language and Learning	10.7	10.5	0.3	13.0	10.3	10.1	0.2	9.2	10.9	10.7	0.2	7.0
Parent-Child Play**	4.6	4.3	0.2*	25.7	4.4	4.2	0.2*	18.1	4.4	4.4	-0.1	-5.5
Quality of Assistance During Parent-Child Puzzle Challenge Task	3.6	3.5	0.0	3.7	3.6	3.3	0.3**	24.8	3.6	3.5	0.0	2.7
Percentage of Parents Who Read to Child Daily***	57.9	50.8	7.0	14.1	59.0	45.0	14.0***	28.0	54.5	55.7	-1.2	-2.4
Percentage of Parents Who Read to Child at Bedtime***	30.6	32.4	-1.7	-3.8	36.7	30.8	5.9	13.0	29.6	25.8	3.8	8.4

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TABLE E.VI.1 *(continued)*

	Center-Based Programs				Mixed-Approach Programs				Home-Based Programs			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Parenting Behavior: Negative Parenting Behavior												
Detachment During Parent-Child Semistructured Play**	1.2	1.1	0.1	16.2	1.2	1.4	-0.2**	-23.8	1.2	1.3	-0.1	-9.4
Intrusiveness During Parent-Child Semistructured Play	1.5	1.6	-0.1	-13.9	1.6	1.7	-0.0	-3.3	1.6	1.6	-0.1	-6.4
Detachment During Parent-Child Puzzle Challenge Task	1.6	1.6	0.0	4.7	1.7	1.9	-0.2	-16.4	1.6	1.6	-0.0	-3.5
Intrusiveness During Parent-Child Puzzle Challenge Task	2.8	2.7	0.1	4.3	2.8	2.9	-0.1	-10.8	2.5	2.6	-0.1	-8.7
Negative Regard During Parent-Child Semistructured Play	1.3	1.3	0.0	1.2	1.3	1.3	0.0	6.0	1.2	1.3	-0.1	-9.5
HOME Harshness	0.3	0.3	0.0	3.3	0.2	0.2	0.0	1.1	0.3	0.3	0.0	5.6
Percentage of Parents Who Spanked Child in the Past Week***	51.4	61.0	-9.6	-19.2	46.6	57.6	-10.9**	-21.9	44.1	49.6	-5.5	-10.9
Knowledge of Safety Practices and Discipline Strategies												
Percentage of Parents Who Usually Use a Car Seat Correctly***	63.0	75.3	-12.3**	-26.8	73.7	71.6	2.2	4.7	70.4	69.4	1.0	2.2
Percentage of Parents Suggesting Physical Punishment as a Discipline Strategy***	52.0	60.6	-8.6	-17.2	43.9	53.5	-9.6**	-19.2	44.9	44.5	0.4	0.8
Percentage of Parents Who Would Use Mild Discipline Only***	36.8	30.9	5.9	11.9	49.2	39.1	10.1***	20.5	45.8	45.9	-0.1	-0.2
Index of Severity of Discipline Strategies	3.6	3.9	-0.2	-14.0	3.2	3.6	-0.4***	-22.6	3.3	3.3	-0.0	-1.8
Parent Physical and Mental Health												
Parent's Health Status	3.5	3.5	-0.0	-2.5	3.5	3.5	-0.1	-5.3	3.4	3.4	-0.1	-5.9
Parenting Stress Index (PSI) Parental Distress	23.9	25.0	-1.1	-11.7	24.8	25.9	-1.1	-11.2	24.9	26.3	-1.4**	-14.4
PSI Parent-Child Dysfunctional Interaction	17.6	17.2	0.4	7.0	18.1	17.7	0.4	6.7	17.5	18.1	-0.6	-10.4

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TABLE E.VI.1 (*continued*)

	Center-Based Programs				Mixed-Approach Programs				Home-Based Programs			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Center for Epidemiological Studies Depression (CES-D; Short Form)	7.3	7.1	0.2	2.6	7.2	7.8	-0.6	-8.2	7.7	7.9	-0.1	-1.8
CES-D Severe Depressive Symptoms***	15.8	8.7	7.1*	19.8	14.2	15.3	-1.2	-3.2	14.4	16.1	-1.6	-4.5
Family Environment Scale (FES): Family Conflict	1.6	1.7	-0.1	-11.1	1.7	1.7	-0.0	-4.6	1.7	1.7	-0.0	-0.8
Father Presence												
Currently Married to Biological Father***	28.4	29.7	-1.2	-2.5	34.5	35.1	-0.6	-1.2	38.1	40.0	-1.9	-3.9
Biological Father is Currently Married to, Lives with, or is Boyfriend of Respondent***	46.0	48.2	-2.2	-4.3	46.0	46.9	-0.9	-1.9	52.9	56.0	-3.1	-6.2
Biological Father Currently Present in Child's Life***	75.9	71.9	4.0	8.9	70.6	68.7	1.9	4.3	72.9	75.7	-2.8	-6.3
Continuous Biological Father Presence Child Age 14-36 Months***	71.7	68.5	3.2	6.9	64.3	66.2	-1.9	-4.2	67.6	72.0	-4.5	-9.8
No Biological Father Presence Child Age 14-36 Months***	7.3	10.6	-3.3	-10.4	15.6	14.8	0.8	2.5	12.0	10.0	2.0	6.4
Continuous Male Presence Child Age 14-36 Months***	80.8	82.7	-1.9	-5.3	79.4	79.0	0.3	0.9	78.9	85.9	-7.0**	-19.4
No Male Presence Child Age 14-36 Months***	1.1	1.7	-0.6	-5.3	3.0	1.5	1.5	12.5	2.4	1.3	1.1	9.0
Sample Size												
Bayley	217	172	389		266	257	523		396	350	746	
Parent Interview	254	211	465		351	344	695		502	448	950	
Parent-Child Interactions	227	181	408		251	255	506		396	348	744	

SOURCE: Parent interviews, child assessments, interviewer observations, and assessments of semistructured parent-child interactions conducted when children were approximately 36 months old.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

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TABLE E.VI.1 (*continued*)

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE E.VI.2

IMPACTS ON SELF-SUFFICIENCY AT 28 MONTHS, BY PROGRAM APPROACH IN 1997

	Center-Based Programs				Mixed-Approach Programs				Home-Based Programs			
Outcome	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c
Education/Job Training												
Ever in Education or Training***^{d}	65.1	61.5	3.6	7.2	65.1	51.3	13.8***	27.7	53.1	45.5	7.6**	15.3
Ever in High School***	13.1	11.6	1.5	5.2	15.1	10.6	4.6*	16.0	12.6	6.8	5.7***	20.1
Ever in ESL Class***	1.5	2.7	-1.3	-8.9	5.0	3.3	1.7	11.9	3.4	2.4	1.0	7.2
Ever in Vocational Program***	19.3	17.9	1.5	3.9	22.7	17.6	5.1	13.6	18.2	15.7	2.5	6.6
Average Hours per Week in Education or Training	5.4	5.0	0.5	7.1	4.2	3.3	0.9*	14.5	4.5	3.0	1.6***	24.3
In Education or Training:												
1st Quarter***	24.9	29.6	-4.6	-11.2	22.5	19.0	3.4	8.3	21.2	21.6	-0.4	-1.0
2nd Quarter***	31.4	34.7	-3.3	-7.7	27.1	22.1	5.1	11.8	25.1	22.9	2.2	5.0
3rd Quarter***	37.7	31.7	6.0	13.6	31.3	24.9	6.5*	14.7	28.2	26.5	1.7	3.8
4th Quarter***	38.0	31.0	6.9	16.2	31.4	25.0	6.5*	15.1	27.1	22.5	4.6*	10.7
5th Quarter***	35.5	30.2	5.2	12.1	29.8	27.1	2.8	6.4	28.6	22.9	5.8**	13.4
6th Quarter***	34.3	27.8	6.5	15.6	27.5	23.2	4.4	10.5	28.7	21.3	7.4***	17.9
7th Quarter***	31.2	28.7	2.5	6.3	26.5	23.5	3.0	7.5	23.1	17.6	5.5**	13.7
8th Quarter***	29.3	28.2	1.1	2.9	27.6	20.4	7.2*	18.4	24.3	15.6	8.7***	22.1
Have High School Diploma ***	52.4	13.3	-0.5	-1.5	50.2	48.9	1.3	2.5	49.1	45.7	3.5	6.9
Have GED***	12.8	56.9	-4.6	-9.1	10.1	8.4	1.7	5.5	8.5	11.5	-2.9	-9.2
Employment												
Ever Employed***	91.3	87.3	4.1	10.8	88.6	82.0	6.6**	17.5	83.1	81.8	1.3	3.5
Average Hours/Week Employed	21.6	21.3	0.3	2.1	16.8	15.6	1.2	7.9	14.8	15.1	-0.3	-2.0
Employed in:												
1st Quarter***	53.4	49.4	4.0	8.2	35.5	35.6	-0.1	-0.2	33.8	36.1	-2.2	-4.6
2nd Quarter***	59.4	54.5	4.9	9.8	45.3	41.8	3.5	7.0	38.2	42.9	-4.7	-9.5
3rd Quarter***	63.5	58.9	4.6	9.3	52.8	50.0	2.8	5.7	46.9	50.1	-3.3	-6.5
4th Quarter***	66.4	63.3	3.1	6.2	56.4	52.6	3.8	7.6	51.9	51.7	0.2	0.3
5th Quarter***	71.0	66.4	4.6	9.4	60.3	55.1	5.3	10.7	57.7	58.9	-1.2	-2.4
6th Quarter***	71.3	66.7	4.7	9.5	62.3	55.5	6.8	13.8	61.7	58.2	3.5	7.0
7th Quarter***	64.0	64.9	-0.9	-1.9	61.2	53.7	7.5*	15.1	57.5	55.0	2.4	4.9
8th Quarter***	70.4	67.3	3.1	6.4	67.2	56.8	10.4**	21.3	55.9	59.9	-4.0	-8.1
Any Self-Sufficiency-Oriented Activity (Education, Training, or Employment)												
Ever Employed or in Education/Training***	97.7	94.6	3.1	10.1	95.6	90.1	5.5**	18.2	90.5	88.9	1.6	5.4
Average Hours per Week in Any Activity	28.2	26.8	1.4	8.9	21.3	19.2	2.1	13.6	19.9	18.5	1.3	8.5
In Activities in:												
1st Quarter***	68.0	67.9	0.1	0.2	51.0	48.1	3.0	5.9	47.3	48.4	-1.1	-2.2
2nd Quarter***	78.9	72.8	6.1	12.3	61.8	54.1	7.7**	15.5	53.4	55.5	-2.1	-4.2

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TABLE E.VI.2 (*continued*)

	Center-Based Programs				Mixed-Approach Programs				Home-Based Programs			
Outcome	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c
3rd Quarter***	83.8	76.1	7.6*	16.1	70.4	63.3	7.1*	14.9	62.3	62.9	-0.6	-1.3
4th Quarter***	86.1	75.9	10.2**	21.4	71.7	64.5	7.2*	15.0	65.2	61.6	3.6	7.6
5th Quarter***	85.4	78.5	6.8	14.8	73.8	67.1	6.7*	14.5	69.6	67.9	1.7	3.6
6th Quarter***	88.2	76.3	12.0**	25.5	74.5	65.7	8.8**	18.6	72.9	66.4	6.5**	13.9
7th Quarter***	81.1	76.1	5.0	10.5	71.7	64.1	7.6*	16.0	66.4	62.7	3.7	7.6
8th Quarter***	84.8	77.2	7.6	16.3	77.2	65.1	12.1***	25.9	65.2	66.6	-1.4	-3.1
AFDC/TANF Receipt												
Ever Received AFDC/TANF***	32.7	28.6	4.1	8.2	46.8	45.7	1.1	2.2	55.2	52.5	2.7	5.5
Received AFDC/TANF in:												
1st Quarter***	21.4	18.2	3.2	6.9	32.9	29.6	3.3	7.0	42.2	29.4	2.7	5.8
2nd Quarter***	28.1	17.8	3.4	7.1	34.5	32.4	2.1	4.5	41.9	42.4	-0.5	-1.1
3rd Quarter***	19.1	20.8	-1.7	-3.5	36.9	33.0	3.9	8.1	46.2	43.9	2.3	4.7
4th Quarter***	18.3	17.4	0.8	1.8	30.4	26.5	3.8	8.2	37.2	38.1	-0.9	-1.9
5th Quarter***	18.0	14.7	3.3	7.2	30.0	27.0	3.0	6.5	36.0	37.8	-1.8	-3.9
6th Quarter***	19.4	16.0	3.4	7.4	26.6	26.7	-0.0	-0.1	36.4	38.5	-2.1	-4.5
7th Quarter***	14.4	14.5	-0.0	-0.0	23.1	23.1	-0.1	-0.1	27.4	32.1	-4.7*	-10.8
8th Quarter***	15.5	13.0	2.5	5.9	19.9	23.6	-3.7	-8.6	27.8	27.8	0.0	0.0
Total AFDC/TANF Benefits ($)	$908	$767	$142	3.7	$2,331	$2,111	$220	5.7	$2,676	$2,834	-$158	-4.1
Receipt of Other Welfare Benefits												
Ever Received Welfare***	63.0	62.6	0.3	0.7	66.0	64.0	2.0	4.3	72.9	70.5	2.5	5.2
Total Welfare Benefits ($)	$3,963	$4,478	-$515	-6.8	$5,422	$5,851	-$429	-5.7	$5,929	$6,089	-$160	-2.1
Ever Received Food Stamps***	53.9	53.2	0.7	1.5	58.2	56.5	1.7	3.5	66.7	65.4	1.3	2.6
Total Food Stamp Benefits ($)	$1,636	$1,994	-$358	-13.2	$2,152	$2,023	$129	4.7	$2,298	$2,153	$145	5.3
Income/Poverty												
Income Above Poverty Level***	47.8	51.0	-3.2	-6.5	41.9	43.5	-1.6	-3.3	41.1	40.8	0.3	0.5
Subsequent Births												
Subsequent Birth by 24 Months after Random Assignment***	15.1	18.9	-3.8	-8.4	24.6	30.5	-5.9	-13.2	26.3	28.4	-2.1	-4.7
Sample Size	**230**	**204**	**434**		**358**	**354**	**712**		**488**	**453**	**941**	

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

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TABLE E.VI.2 (*continued*)

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE E.VI.3

IMPACTS ON CHILD AND FAMILY OUTCOMES AT AGE 3, BY PATTERN OF PROGRAM IMPLEMENTATION

	Early Implementers				Later Implementers				Incomplete Implementers			
Outcome	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c
Child Cognitive and Language Development												
Bayley Mental Development Index (MDI) Standard Score	94.1	92.0	2.2*	16.7	88.2	86.0	2.2**	16.9	92.1	92.1	-0.1	-0.4
Percentage with MDI < 85***^{d}	24.1	27.0	-5.6	-11.9	36.5	43.1	-6.6	-14.2	23.8	25.8	-2.0	-4.3
Peabody Picture Vocabulary Test (PPVT)-III Standard Score	86.0	84.8	1.3	7.9	78.4	75.2	3.3*	20.0	84.8	83.2	1.6	9.9
Percentage with PPVT-III < 85***	43.1	50.5	-7.5	-15.0	65.4	71.2	-5.8	-11.7	46.6	51.9	-5.3	-10.6
Child Social-Emotional Development												
Engagement of Parent During Parent-Child Semistructured Play	4.9	4.8	0.1	11.1	4.7	4.5	0.2**	22.0	4.9	4.5	0.4***	36.7
Sustained Attention with Objects During Parent-Child Semistructured Play	5.1	5.0	0.1	14.3	4.8	4.7	0.1	13.3	5.0	4.8	0.2*	22.0
Engagement of Parent During Parent-Child Puzzle Challenge Task	5.1	5.0	0.1	7.1	4.9	4.9	0.1	5.3	5.1	4.9	0.2	17.5
Persistence During Parent-Child Puzzle Challenge Task	4.7	4.7	-0.0	-2.0	4.4	4.4	0.1	8.3	4.6	4.4	0.2	19.4
Bayley Behavioral Rating Scale (BRS): Emotional Regulation	4.0	4.0	0.0	2.6	4.0	3.9	0.1	9.1	4.0	4.1	-0.1	-10.5
Bayley BRS: Orientation/ Engagement	4.0	4.0	0.1	8.5	3.6	3.6	0.1	6.8	3.9	3.9	0.0	0.8
Negativity Toward Parent During Parent-Child Semistructured Play	1.2	1.3	-0.1**	-17.7	1.3	1.3	-0.1	-9.3	1.3	1.3	-0.1	-10.6
Frustration During Parent-Child Puzzle Challenge Task	2.8	2.9	-0.0	-2.3	2.6	2.5	0.2	13.6	2.6	2.6	0.0	0.3

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TABLE E.VI.3 (continued)

	Early Implementers				Later Implementers				Incomplete Implementers			
Outcome	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c
Child Behavior Checklist—Aggressive Behavior	11.1	11.8	-0.7	-11.4	10.8	11.0	-0.2	-3.4	9.8	11.6	-1.8***	-28.2
Child Health Status												
Child's Health Status	4.1	4.1	-0.0	-3.4	4.0	3.9	0.1	10.2	4.0	4.1	-0.1	-10.4
Percentage of Children in Fair or Poor Health***	7.4	6.9	0.4	1.5	8.7	11.4	-2.7	-9.4	8.2	8.1	0.1	0.2
Quality of the Home Environment and Parenting: Overall and Physical Environment												
Home Observation for Measurement of the Environment (HOME) Total Score	28.3	27.3	1.0**	19.5	26.3	26.1	0.2	3.9	28.3	27.9	0.5	9.2
HOME Internal Physical Environment	7.9	7.7	0.2	12.2	7.7	7.8	-0.2	-11.5	7.9	7.8	0.1	8.1
Parenting Behavior: Emotional Support												
HOME Warmth	2.5	2.4	0.2**	18.4	2.5	2.4	0.1	7.2	2.7	2.7	0.0	1.0
Supportiveness During Parent-Child Semistructured Play	4.1	4.1	0.0	4.6	3.8	3.6	0.2**	19.9	4.1	3.8	0.2*	22.6
Supportive Presence During Parent-Child Puzzle Challenge Task	4.9	4.8	0.1	10.7	4.1	4.1	0.0	0.6	4.4	4.4	0.0	2.3
Parenting Behavior: Stimulation of Language and Learning												
Percentage of Children with a Regular Bedtime***	63.3	63.6	-0.2	-0.4	55.9	51.9	4.0	8.1	59.3	59.9	-0.6	-1.2
Percentage of Children Who Follow a Bedtime Routine***	72.2	70.3	1.9	4.1	66.6	66.3	0.2	0.5	70.0	69.6	0.4	0.9
HOME: Support of Language and Learning	10.8	10.6	0.2	7.8	10.2	9.8	0.3**	16.2	11.0	11.0	0.0	0.2
Parent-Child Play	4.4	4.3	0.1*	13.9	4.4	4.3	0.1	11.6	4.4	4.5	-0.0	-0.7
Quality of Assistance During Parent-Child Puzzle Challenge Task	3.9	3.9	0.1	4.3	3.4	3.2	0.2**	19.7	3.4	3.4	0.0	3.3
Percentage of Parents Who Read to Child Daily***	63.3	52.0	11.3***	22.6	49.5	43.3	6.2	12.3	57.6	58.9	-1.3	-2.7

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TABLE E.VI.3 (*continued*)

	Early Implementers				Later Implementers				Incomplete Implementers			
Outcome	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c
Percentage of Parents Who Read to Child at Bedtime***	40.9	34.6	6.3	13.9	27.1	20.7	6.5*	14.2	28.1	31.0	-2.8	-6.2
Parenting Behavior: Negative Parenting Behavior												
Detachment During Parent-Child Semistructured Play**	1.2	1.2	0.0	2.0	1.2	1.3	-0.1*	-17.5	1.2	1.2	-0.1	-9.8
Intrusiveness During Parent-Child Semistructured Play	1.4	1.5	-0.1	-6.7	1.7	1.7	-0.0	-2.3	1.7	1.7	-0.1	-7.0
Detachment During Parent-Child Puzzle Challenge Task	1.6	1.6	-0.0	-3.0	1.7	1.7	-0.0	-2.4	1.6	1.7	-0.1	-4.9
Intrusiveness During Parent-Child Puzzle Challenge Task	2.5	2.5	0.0	0.0	2.9	3.1	-0.2*	-16.6	2.6	2.6	-0.0	-1.8
Negative Regard During Parent-Child Semistructured Play	1.3	1.3	0.0	2.4	1.3	1.3	-0.0	-3.5	1.3	1.3	-0.0	-0.4
HOME Harshness**	0.2	0.3	-0.1	-12.1	0.4	0.2	0.1**	20.6	0.3	0.3	-0.0	-1.0
Percentage of Parents Who Spanked Child in the Past Week***	44.0	52.2	-8.1*	-16.3	46.8	55.7	-8.9**	-17.9	49.6	56.7	-7.2	-14.4
Knowledge of Safety Practices and Discipline Strategies												
Percentage of Parents Who Usually Use a Car Seat Correctly***	73.3	73.9	-0.5	-1.2	72.3	74.8	-2.5	-5.4	62.3	68.8	-6.5	-14.2
Percentage of Parents Suggesting Physical Punishment as a Discipline Strategy***	31.5	42.0	-10.5***	-20.9	54.4	59.3	-4.9	-9.7	54.2	55.8	-1.6	-3.2
Percentage of Parents Who Would Use Mild Discipline Only***	58.8	49.5	9.3**	18.8	37.3	30.2	7.1*	14.4	36.8	37.9	-1.1	-2.3
Index of Severity of Discipline Strategies	2.9	3.3	-0.4***	-23.3	3.6	3.9	-0.2**	-14.7	3.6	3.6	-0.0	-1.2
Parent Physical and Mental Health												
Parent's Health Status	3.4	3.5	-0.1	-6.7	3.4	3.3	0.1	11.0	3.5	3.6	-0.1	-13.4
Parenting Stress Index (PSI) Parental Distress	24.3	25.0	-0.7	-7.7	25.9	26.3	-0.5	-5.0	23.8	25.5	-1.7*	-17.6

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TABLE E.VI.3 (*continued*)

	Early Implementers				Later Implementers				Incomplete Implementers			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
PSI Parent-Child Dysfunctional Interaction	18.0	17.6	0.4	6.9	17.8	17.9	-0.2	-2.8	17.4	17.8	-0.5	-7.3
Center for Epidemiological Studies Depression (CES-D; Short Form)	7.6	8.7	-1.1*	-15.5	7.5	7.4	0.1	1.6	7.0	7.1	-0.1	-1.4
CES-D Severe Depressive Symptoms ***	14.9	17.3	-2.4	-6.7	14.5	13.8	0.7	2.1	13.9	13.8	0.1	0.3
Family Environment Scale (FES): Family Conflict	1.7	1.7	-0.0	-8.0	1.7	1.7	0.0	0.5	1.6	1.7	-0.1	-15.2
Father Presence												
Currently Married to Biological Father ***	41.0	40.5	0.5	1.1	35.2	36.2	-1.0	-2.1	26.6	30.4	-3.8	-7.8
Biological Father is Currently Married to, Lives with, or is Boyfriend of Respondent***	52.7	52.1	0.7	1.3	47.4	53.2	-5.8	-11.6	46.0	48.8	-2.8	-5.6
Biological Father Currently Present in Child's Life***	71.1	69.9	1.3	2.8	72.7	70.9	1.8	4.0	74.8	72.1	2.8	6.2
Continuous Biological Father Presence Child Age 14-36 Months***	66.1	70.6	-4.6	-9.9	66.5	69.1	-2.7	-5.8	69.0	68.2	0.8	1.7
No Biological Father Presence Child Age 14-36 Months***	14.4	10.2	4.2	13.5	12.2	12.7	-0.5	-1.4	10.3	10.0	0.2	0.8
Continuous Male Presence Child Age 14-36 Months***	78.7	83.9	-5.2	-14.5	79.6	85.3	-5.7	-15.9	80.3	80.7	-0.3	-0.9
No Male Presence Child Age 14-36 Months***	2.2	1.0	1.2	9.7	2.5	1.9	0.6	4.8	1.9	2.1	-0.2	-1.5
Sample Size												
Bayley	305	298	603		336	277	613		238	204	442	
Parent Interview	388	358	746		418	362	780		301	283	584	
Parent-Child Interactions	306	291	597		348	295	643		220	198	418	

SOURCE: Parent interviews, child assessments, interviewer observations, and assessments of semistructured parent-child interactions conducted when children were approximately 36 months old.

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TABLE E.VI.3 *(continued)*

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE E.VI.4

IMPACTS ON SELF-SUFFICIENCY AT 28 MONTHS, BY PATTERN OF IMPLEMENTATION

	Early Implementers				Later Implementers				Incomplete Implementers			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Education/Job Training												
Ever in Education or Training***[d]	60.6	53.2	7.4*	14.8	56.4	51.2	5.1	10.3	63.5	52.0	11.5**	23.0
Ever in High School***	7.4	6.9	0.5	1.7	15.7	11.9	3.8*	13.2	18.5	9.4	9.1***	31.9
Ever in ESL Class***	2.9	3.2	-0.3	-2.4	4.4	3.0	1.3	9.3	3.1	2.2	1.0	6.8
Ever in Vocational Program***	20.5	17.2	3.3	8.7	16.3	17.3	-1.0	-2.7	23.1	18.0	5.1	13.7
Average Hours per Week in Education or Training	3.4	3.1	0.3	4.0	4.5	3.4	1.1**	17.9	6.1	4.2	1.9**	29.8
In Education or Training:												
1st Quarter***	23.6	19.3	4.4	10.6	21.8	23.0	-1.2	-3.0	21.2	26.0	-4.8	-11.7
2nd Quarter***	23.6	23.2	0.4	1.0	27.8	24.2	3.6	8.3	30.3	29.1	1.3	2.9
3rd Quarter***	25.9	23.8	2.1	4.7	30.6	27.3	3.2	7.3	39.0	31.2	7.8*	17.6
4th Quarter***	28.2	23.5	4.8	11.1	29.1	24.2	4.9	11.5	37.0	29.4	7.6*	17.7
5th Quarter***	27.1	25.1	2.1	4.8	29.0	25.8	3.3	7.6	36.5	27.9	8.6**	20.0
6th Quarter***	27.8	24.0	3.7	9.0	25.8	23.7	2.1	5.0	36.2	23.9	12.3***	29.6
7th Quarter***	22.5	22.5	-0.0	-0.1	24.7	22.9	1.8	4.5	32.6	17.8	14.8***	36.9
8th Quarter***	22.1	20.0	2.1	5.3	26.0	21.0	5.0	12.7	32.6	18.1	14.5***	37.1
Have High School Diploma***	56.5	57.0	-0.5	-0.9	37.4	41.4	-4.0	-7.9	58.7	51.6	7.1	14.2
Have GED***	14.0	10.8	3.3	10.3	8.4	6.6	1.8	5.7	7.2	15.4	-8.2**	-25.9
Employment												
Ever Employed***	90.0	84.2	5.8**	15.4	82.3	82.9	-0.6	-1.5	88.0	82.2	5.7	15.3
Average Hours/Week Employed	18.6	17.0	1.6	10.9	15.9	16.9	-1.0	-6.8	16.9	16.8	0.1	0.5
Employed in:												
1st Quarter***	44.5	43.3	1.2	2.5	37.8	35.9	1.9	4.0	33.7	37.2	-3.5	-7.2
2nd Quarter***	53.0	49.8	3.2	6.4	42.8	44.3	-1.5	-3.0	39.8	42.5	-2.8	-5.5
3rd Quarter***	61.8	56.5	5.3	10.6	46.8	50.8	-4.0	-8.0	49.6	50.3	-0.7	-1.4
4th Quarter***	66.4	58.5	7.9**	15.9	50.5	50.7	-0.3	-0.5	52.9	55.1	-2.3	-4.6
5th Quarter***	68.9	59.6	9.3***	18.9	58.5	57.2	1.3	2.7	55.9	60.2	-4.4	-8.9
6th Quarter***	68.1	58.0	10.0**	20.3	59.2	57.3	1.9	3.8	64.7	61.4	3.3	6.7
7th Quarter***	61.4	57.2	4.2	8.4	60.4	57.6	2.8	5.7	59.5	54.9	4.6	9.2
8th Quarter***	66.7	60.1	6.6	13.5	61.3	59.9	1.4	2.8	61.7	64.1	-2.3	-4.8
Any Self-Sufficiency-Oriented Activity (Education, Training or Employment)												
Ever Employed or in Education/Training***	94.8	90.8	4.0*	13.1	91.3	89.9	1.3	4.4	96.1	90.2	5.9**	19.4
Average Hours per Week in Any Activity	22.3	20.8	1.5	9.6	21.2	20.7	0.5	3.2	23.8	21.4	2.4	15.3
In Activities in:												
1st Quarter***	57.8	53.5	4.4	8.8	51.8	50.3	1.5	3.1	49.4	53.9	-4.1	-8.1

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TABLE E.VI.4 *(continued)*

	Early Implementers				Later Implementers				Incomplete Implementers			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
2nd Quarter***	64.3	59.8	4.4	9.0	60.7	57.8	2.9	5.8	61.8	59.2	2.5	5.1
3rd Quarter***	72.1	69.2	2.9	6.2	64.7	64.3	0.4	0.9	74.9	65.6	9.2**	19.4
4th Quarter***	77.6	68.0	9.7***	20.2	66.4	63.8	2.6	5.4	73.6	66.0	7.5*	15.8
5th Quarter***	77.3	71.2	6.1*	13.2	71.5	68.2	3.3	7.2	74.8	68.9	5.9	12.7
6th Quarter***	77.9	68.9	9.0**	19.1	71.2	66.6	4.5	9.6	82.3	68.3	14.0***	29.8
7th Quarter***	71.1	67.9	3.2	6.8	69.4	65.7	3.7	7.7	76.2	62.3	13.8***	28.9
8th Quarter***	75.1	68.0	7.1*	15.3	70.6	68.2	2.4	5.2	77.4	70.2	7.2	15.4
AFDC/TANF Receipt												
Ever Received AFDC/TANF***	40.1	39.5	0.6	1.2	48.7	44.9	3.8	7.5	53.8	49.1	4.7	9.4
Received AFDC/TANF in:												
1st Quarter***	29.9	27.3	2.6	5.5	33.9	28.8	5.2*	11.1	38.8	36.9	1.9	3.9
2nd Quarter***	30.7	27.6	3.1	6.6	33.5	30.0	3.6	7.5	40.3	41.2	-0.9	-1.9
3rd Quarter***	31.6	28.9	2.7	5.7	35.0	33.7	1.3	2.7	45.5	42.2	3.3	6.9
4th Quarter***	24.4	24.1	0.3	0.5	29.3	28.4	0.9	1.9	40.1	37.2	2.9	6.3
5th Quarter***	21.7	25.4	-3.8	-8.2	30.6	26.5	4.1	9.0	38.8	35.9	2.9	6.4
6th Quarter***	20.2	25.8	-5.6*	-12.2	30.6	27.0	3.6	7.8	38.5	38.8	-0.3	-0.6
7th Quarter***	17.8	20.2	-2.4	-5.4	25.3	23.0	2.4	5.4	26.4	34.8	-8.4*	-19.2
8th Quarter***	16.0	19.5	-3.4	-8.1	24.9	21.5	3.4	7.9	26.5	29.7	-3.2	-7.5
Total AFDC/TANF Benefits ($)	$1,992	$2,152	-$160	-4.1	$2,116	$1,958	$158	4.1	$2,391	$2,416	-$25	-0.7
Receipt of Other Welfare Benefits												
Ever Received Welfare***	66.4	64.3	2.1	4.5	70.0	67.6	2.3	5.0	68.8	65.7	3.2	6.7
Total Welfare Benefits ($)	$5,208	$5,486	-$278	-3.7	$5,310	$5,628	-$318	-4.2	$5,376	$5,652	-$276	-3.7
Ever Received Food Stamps***	58.1	58.5	-0.4	-0.7	62.7	60.3	-2.4	4.9	62.3	58.8	3.5	7.2
Total Food Stamp Benefits ($)	$2,065	$2,154	-$90	-3.3	$1,987	$1,868	$120	4.4	$2,377	$2,303	$74	2.7
Income/Poverty												
Income Above Poverty Level***	41.9	44.9	-3.0	-6.1	36.2	43.1	-6.8*	-13.9	52.3	40.3	11.9**	24.2
Subsequent Births												
Subsequent Birth by 24 Months after Random Assignment***	22.0	28.3	-6.4	-14.2	26.5	27.1	-0.6	-1.4	19.6	26.7	-7.1	-15.7
Sample Size	266	367	733		410	374	784		300	270	570	

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

7A3

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TABLE E.VI.4 (*continued*)

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE E.VI.5

IMPACTS ON CHILD AND FAMILY OUTCOMES AT AGE 3, BY IMPLEMENTATION STATUS OF MIXED APPROACH PROGRAMS

	Early Implementation				Late or Incomplete Implementation			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Child Cognitive and Language Development								
Bayley Mental Development Index (MDI) Standard Score*[d]	93.1	89.5	3.7*	28.3	85.4	86.4	-1.0	-7.7
Percentage with MDI < 85***	27.2	36.4	-9.2	-19.7	45.3	43.6	1.7	3.6
Peabody Picture Vocabulary Test (PPVT)-III Standard Score	85.8	83.4	2.4	14.9	78.3	73.4	4.9	29.8
Percentage with PPVT-III < 85***	45.7	62.6	-16.9**	-33.9	66.2	70.2	-4.0	-8.1
Child Social-Emotional Development								
Engagement of Parent During Parent-Child Semistructured Play	4.9	4.5	0.5***	43.4	4.6	4.4	0.2	19.9
Sustained Attention with Objects During Parent-Child Semistructured Play	5.1	4.7	0.4***	41.7	4.8	4.7	0.2	16.8
Engagement of Parent During Parent-Child Puzzle Challenge Task	5.0	4.9	0.0	3.4	5.0	4.9	0.1	11.5
Persistence During Parent-Child Puzzle Challenge Task	4.6	4.5	0.1	11.6	4.4	4.4	-0.0	-2.0
Bayley Behavioral Rating Scale (BRS): Emotional Regulation	4.0	4.1	-0.1	-15.2	4.0	4.1	-0.1	-15.2
Bayley BRS: Orientation/ Engagement	3.9	4.0	-0.2	-19.7	3.8	4.0	-0.1	-15.7
Negativity Toward Parent During Parent-Child Semistructured Play	1.2	1.4	-0.1	-21.1	1.3	1.3	0.0	2.2
Frustration During Parent-Child Puzzle Challenge Task	2.9	2.9	-0.0	-1.4	2.8	2.5	0.2	17.6
Child Behavior Checklist—Aggressive Behavior	11.0	12.0	-1.0	-14.8	10.3	10.3	-0.1	-0.8
Child Health Status								
Child's Health Status	4.1	4.2	-0.1	-14.2	4.2	4.0	0.2	17.1
Percentage of Children in Fair or Poor Health***	6.3	4.8	1.5	5.4	4.5	7.4	-2.9	-10.2
Quality of the Home Environment and Parenting: Overall and Physical Environment								
Home Observation for Measurement of the Environment (HOME) Total Score	27.8	27.1	0.6	12.8	26.3	26.0	0.3	5.8
HOME Internal Physical Environment	7.7	7.7	0.0	0.7	7.8	7.9	-0.1	-5.6
Parenting Behavior: Emotional Support								
HOME Warmth	2.5	2.3	0.1	13.8	2.4	2.4	0.0	0.7
Supportiveness During Parent-Child Semistructured Play	4.1	3.8	0.3	27.1	3.8	3.6	0.2	18.4
Supportive Presence During Parent-Child Puzzle Challenge Task**	4.8	4.3	0.6***	42.2	4.0	4.0	-0.1	-3.6
Parenting Behavior: Stimulation of Language and Learning								
Percentage of Children with a Regular Bedtime***	58.5	66.1	-7.6	-15.4	59.9	62.0	-2.1	-4.2
Percentage of Children Who Follow a Bedtime Routine***	66.5	62.6	3.9	8.5	69.8	73.2	-3.3	-7.2

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TABLE E.VI.5 (*continued*)

	Early Implementation				Late or Incomplete Implementation			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
HOME: Support of Language and Learning	10.5	10.3	0.2	8.8	10.1	9.8	0.3	13.9
Parent-Child Play	4.3	4.1	0.2*	24.3	4.5	4.3	0.1	14.8
Quality of Assistance During Parent-Child Puzzle Challenge Task	3.9	3.6	0.3*	27.8	3.3	3.0	0.3*	25.1
Percentage of Parents Who Read to Child Daily***	60.4	37.3	23.1***	46.2	58.0	50.4	7.6	15.2
Percentage of Parents Who Read to Child at Bedtime***	39.0	27.4	11.6	25.5	35.2	32.0	3.2	7.1
Parenting Behavior: Negative Parenting Behavior								
Detachment During Parent-Child Semistructured Play	1.3	1.4	-0.1	-22.1	1.1	1.4	-0.2**	-35.7
Intrusiveness During Parent-Child Semistructured Play	1.5	1.6	-0.1	-7.8	1.8	1.7	0.1	7.0
Detachment During Parent-Child Puzzle Challenge Task	1.6	2.0	-0.4**	-37.2	1.8	2.0	-0.2	-18.8
Intrusiveness During Parent-Child Puzzle Challenge Task*	2.6	2.9	-0.4*	-27.4	2.9	2.8	0.2	13.5
Negative Regard During Parent-Child Semistructured Play	1.4	1.3	0.0	5.6	1.3	1.3	0.1	10.4
HOME Harshness	0.2	0.2	-0.0	-3.2	0.3	0.2	0.1	13.7
Percentage of Parents Who Spanked Child in the Past Week***	42.3	55.5	-13.2*	-26.5	50.7	61.8	-11.1*	-22.2
Knowledge of Safety Practices and Discipline Strategies								
Percentage of Parents Who Usually Use a Car Seat Correctly***	73.8	68.9	4.9	10.8	73.4	77.0	-3.6	-7.9
Percentage of Parents Suggesting Physical Punishment as a Discipline Strategy***	33.0	51.9	-18.9***	-37.8	54.9	58.3	-3.4	-6.8
Percentage of Parents Who Would Use Mild Discipline Only***	60.0	38.9	21.1***	42.8	38.5	35.0	3.5	7.2
Index of Severity of Discipline Strategies**	2.8	3.5	-0.7***	-43.8	3.6	3.7	-0.1	-7.8
Parent Physical and Mental Health								
Parent's Health Status	3.3	3.4	-0.1	-12.9	3.7	3.6	0.1	8.7
Parenting Stress Index (PSI) Parental Distress	24.2	25.3	-1.1	-11.6	25.4	25.7	-0.4	-3.8
PSI Parent-Child Dysfunctional Interaction	17.6	17.9	-0.4	-5.4	18.6	17.0	1.6*	25.2
Center for Epidemiological Studies Depression (CES-D; Short Form)*	7.2	8.5	-1.3	-18.1	7.1	6.1	1.0	14.3
CES-D Severe Depressive Symptoms ***	15.3	14.9	0.4	1.1	13.0	10.6	2.3	6.5
Family Environment Scale (FES): Family Conflict	1.7	1.8	-0.0	-6.7	1.6	1.6	-0.0	-2.4
Father Presence								
Currently Married to Biological Father ***	35.7	35.2	0.4	0.9	33.3	34.8	-1.6	-3.2
Biological Father is Currently Married to, Lives with, or is Boyfriend of Respondent***	48.3	50.9	-2.6	-5.2	43.5	42.0	1.6	3.1
Biological Father Currently Present in Child's Life***	70.9	67.9	3.1	6.9	69.9	67.8	2.1	4.6

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TABLE E.VI.5 (*continued*)

	Early Implementation				Late or Incomplete Implementation			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Continuous Biological Father Presence Child Age 14-36 Months***	63.2	68.5	-5.3	-11.5	65.5	60.0	5.5	11.9
No Biological Father Presence Child Age 14-36 Months***	16.8	13.3	3.4	11.0	14.3	16.7	-2.4	-7.6
Continuous Male Presence Child Age 14-36 Months***	74.9	79.2	-4.4	-12.2	84.0	77.8	6.3	17.5
No Male Presence Child Age 14-36 Months*	2.9	1.7	1.2	10.1	3.0	1.9	1.2	9.5
Sample Size								
Bayley	**136**	**153**	**289**		**130**	**104**	**234**	
Parent Interview	**173**	**182**	**355**		**178**	**162**	**340**	
Parent-Child Interactions	**122**	**139**	**261**		**129**	**116**	**245**	

SOURCE: Parent interviews, child assessments, interviewer observations, and assessments of semistructured parent-child interactions conducted when children were approximately 36 months old.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE E.VI.6

IMPACTS ON SELF-SUFFICIENCY AT 28 MONTHS, BY IMPLEMENTATION STATUS OF MIXED APPROACH PROGRAMS

	Early Implementers				Late or Incomplete Implementers			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Education/Job Training								
Ever in Education or Training***[d]	60.7	44.1	16.6**	33.2	70.1	57.6	12.5**	25.0
Ever in High School***	7.2	6.8	0.4	1.4	23.9	14.1	9.7**	34.1
Ever in ESL Class***	3.0	2.8	0.2	1.4	7.1	4.2	2.9	20.3
Ever in Vocational Program***	22.2	15.4	6.8	18.0	22.8	19.4	3.3	8.9
Average Hours per Week in Education or Training	2.6	2.6	0.0	0.6	5.9	4.2	1.8**	27.5
In Education or Training:								
1st Quarter***	17.7	12.3	5.3	12.9	27.2	26.7	0.4	1.1
2nd Quarter***	17.2	14.3	2.9	6.6	37.3	29.2	8.1	18.7
3rd Quarter***	21.9	19.7	2.2	5.1	40.8	31.1	9.7*	22.0
4th Quarter***	24.7	21.9	2.8	6.5	38.3	30.0	8.2	19.2
5th Quarter***	22.6	23.2	-0.6	-1.3	36.8	33.3	3.5	8.1
6th Quarter***	25.8	22.1	3.7	8.8	29.0	27.3	1.7	4.1
7th Quarter***	21.9	21.2	0.7	1.8	31.3	24.5	6.8	17.0
8th Quarter***	22.4	14.3	8.1	20.7	33.0	24.5	8.5	21.7
Have High School Diploma***	52.1	50.8	1.3	2.7	48.5	45.0	3.5	7.0
Have GED***	14.7	7.4	7.3	23.1	5.7	9.1	-3.4	-10.7
Employment								
Ever Employed***	88.5	78.2	10.3**	27.5	88.4	82.8	5.6	14.9
Average Hours/Week Employed	15.7	12.9	2.8	18.9	17.8	18.8	-1.0	-6.4
Employed in:								
1st Quarter***	31.7	32.1	-0.3	-0.7	38.8	34.2	4.7	9.6
2nd Quarter***	43.1	35.5	7.6	15.3	47.5	44.8	2.7	5.5
3rd Quarter***	52.5	46.2	6.2	12.4	53.1	56.0	-2.9	-5.8
4th Quarter***	58.6	47.4	11.2*	22.4	54.2	58.2	-4.0	-8.1
5th Quarter***	61.2	46.7	14.6**	29.6	59.4	61.0	-1.7	-3.4
6th Quarter***	60.2	49.5	10.7	21.7	64.4	61.2	3.4	6.8
7th Quarter***	55.5	48.5	7.0	14.1	66.9	57.0	9.9	20.0
8th Quarter***	63.9	50.2	13.8**	28.2	70.3	62.1	8.3	16.9
Any Self-Sufficiency-Oriented Activity (Education, Training, or Employment)								
Ever Employed or in Education/Training***	93.4	86.4	7.0*	23.1	97.7	91.4	6.3**	20.8
Average Hours per Week in Any Activity	18.7	16.1	2.6	16.6	23.9	23.0	0.9	5.9
In Activities in:								
1st Quarter***	44.1	40.7	3.4	6.8	57.6	52.8	4.8	9.7
2nd Quarter***	53.4	43.6	9.9*	20.0	70.2	60.9	9.4*	19.0
3rd Quarter***	63.3	59.1	4.2	8.8	78.0	68.3	9.7*	20.4
4th Quarter***	70.5	59.0	11.5**	24.2	73.1	72.0	1.2	2.4
5th Quarter***	69.5	60.8	8.7	18.9	78.1	72.8	5.3	11.5
6th Quarter***	70.3	61.8	8.5	18.1	78.1	70.1	8.0	17.0
7th Quarter***	64.8	59.6	5.2	10.9	78.5	66.7	11.8**	24.6
8th Quarter***	72.2	57.6	14.6**	31.3	82.1	69.6	12.4**	26.6

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TABLE E.VI.6 (*continued*)

Outcome	Early Implementers: Program Group Participants	Early Implementers: Control Group[a]	Early Implementers: Impact Estimate per Participant[b]	Early Implementers: Effect Size[c]	Late or Incomplete Implementers: Program Group Participants	Late or Incomplete Implementers: Control Group[a]	Late or Incomplete Implementers: Impact Estimate per Participant[b]	Late or Incomplete Implementers: Effect Size[c]
AFDC/TANF Receipt								
Ever Received AFDC/TANF***	54.9	60.3	-5.4	-10.8	38.9	29.8	9.0**	18.2
Received AFDC/TANF in:								
1st Quarter***	42.7	39.7	3.0	6.3	23.3	19.6	3.7	8.0
2nd Quarter***	44.1	42.5	1.6	3.4	25.3	21.3	4.0	8.4
3rd Quarter***	47.4	43.1	4.3	9.0	26.5	23.9	2.6	5.4
4th Quarter***	40.4	38.6	1.8	3.9	20.9	13.9	6.9*	15.0
5th Quarter***	36.2	42.0	-5.8	-12.6	24.4	11.0	13.4***	29.2
6th Quarter***	34.6	41.3	-6.7	-14.5	18.5	12.2	6.3	13.6
7th Quarter***	29.9	33.1	-3.2	-7.2	15.5	12.3	3.3	7.4
8th Quarter***	25.7	33.4	-7.7	-18.0	13.7	14.1	-0.4	-0.9
Total AFDC/TANF Benefits ($)	$3,590	$3,592	-$2	-0.1	$1,046	$688	$358*	9.3
Receipt of Other Welfare Benefits								
Ever Received Welfare***	72.3	76.3	-3.9	-8.4	59.7	53.5	6.2	13.3
Total Welfare Benefits ($)	$7,084	$8,275	-$1,191	-15.7	$3,762	$3,834	-$77	-1.0
Ever Received Food Stamps***	64.0	71.5	-7.5	-15.3	52.6	43.6	9.0**	18.4
Total Food Stamp Benefits ($)	$2,560	$2,653	-$92	-3.4	$1,772	$1,558	$214	7.9
Income/Poverty								
Income Above Poverty Level***	36.3	34.4	1.9	3.9	47.1	50.0	-2.9	-6.0
Subsequent Births								
Subsequent Birth by 24 Months after Random Assignment***	20.0	27.9	-8.0	-17.7	28.6	28.4	0.2	0.4
Sample Size	180	195	375		178	159	367	

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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TABLE E.VI.7

IMPACTS ON CHILD AND FAMILY OUTCOMES AT AGE 3, BY IMPLEMENTATION STATUS FOR HOME-BASED PROGRAMS

	Early or Late Implementers				Incomplete Implementers			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Child Cognitive and Language Development								
Bayley Mental Development Index (MDI) Standard Score*[d]	92.9	90.2	2.7**	21.0	95.5	96.2	-0.7	-5.3
Percentage with MDI < 85***	24.9	27.3	-2.4	-5.2	14.8	14.7	0.1	0.1
Peabody Picture Vocabulary Test (PPVT)-III Standard Score*	81.4	77.2	4.2*	25.6	87.6	88.8	-1.1	-6.8
Percentage with PPVT-III < 85***	55.9	60.1	-4.2	-8.3	35.6	38.3	-2.6	-5.3
Child Social-Emotional Development								
Engagement of Parent During Parent-Child Semistructured Play	4.7	4.7	0.1	9.4	5.0	4.6	0.4**	33.6
Sustained Attention with Objects During Parent-Child Semistructured Play	4.9	4.8	0.0	3.5	5.1	4.9	0.2*	23.6
Engagement of Parent During Parent-Child Puzzle Challenge Task	5.1	5.1	0.0	0.3	5.1	5.0	0.1	12.0
Persistence During Parent-Child Puzzle Challenge Task	4.7	4.6	0.0	2.4	4.8	4.5	0.3	22.3
Bayley Behavioral Rating Scale (BRS): Emotional Regulation	4.0	3.9	0.1	12.3	3.9	4.0	-0.1	-15.1
Bayley BRS: Orientation/ Engagement	3.8	3.7	0.1	10.0	3.9	3.9	-0.1	-6.9
Negativity Toward Parent During Parent-Child Semistructured Play	1.3	1.3	-0.0	-0.8	1.3	1.4	-0.1	-11.6
Frustration During Parent-Child Puzzle Challenge Task	2.7	2.6	0.1	7.9	2.7	2.8	-0.0	-1.2
Child Behavior Checklist—Aggressive Behavior	11.6	12.0	-0.4	-6.8	10.7	11.6	-0.9	-13.7
Child Health Status								
Child's Health Status	3.9	3.9	0.0	0.5	4.1	4.1	-0.1	-4.9
Percentage of Children in Fair or Poor Health***	12.7	12.4	0.2	0.8	6.1	6.7	-0.5	-1.9
Quality of the Home Environment and Parenting: Overall and Physical Environment								
Home Observation for Measurement of the Environment (HOME) Total Score	28.1	27.9	0.2	4.4	28.4	28.3	0.2	3.7
HOME Internal Physical Environment	7.9	8.0	-0.1	-4.8	8.1	8.0	0.1	4.8
Parenting Behavior: Emotional Support								
HOME Warmth	2.7	2.7	0.0	4.2	2.7	2.8	-0.1	-5.6
Supportiveness During Parent-Child Semistructured Play	4.0	3.9	0.1	6.7	4.1	3.9	0.2	21.6
Supportive Presence During Parent-Child Puzzle Challenge Task	4.6	4.6	0.0	1.5	4.5	4.4	0.1	6.3
Parenting Behavior: Stimulation of Language and Learning								
Percentage of Children with a Regular Bedtime***	58.2	55.3	2.8	5.8	61.7	53.9	7.8	15.9
Percentage of Children Who Follow a Bedtime Routine***	70.5	70.0	0.6	1.2	74.9	68.3	6.6	14.2

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TABLE E.VI.7 (*continued*)

	Early or Late Implementers				Incomplete Implementers			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
HOME: Support of Language and Learning	10.7	10.5	0.3	11.9	11.1	11.0	0.1	4.5
Parent-Child Play	4.3	4.3	-0.0	-3.4	4.5	4.5	0.1	-7.2
Quality of Assistance During Parent-Child Puzzle Challenge Task	3.7	3.5	0.2	12.8	3.4	3.6	-0.2	-16.3
Percentage of Parents Who Read to Child Daily***	51.8	53.1	-1.4	-2.8	57.9	59.6	-1.7	-3.3
Percentage of Parents Who Read to Child at Bedtime***	28.9	25.4	3.5	7.7	30.8	27.0	3.7	8.2
Parenting Behavior: Negative Parenting Behavior								
Detachment During Parent-Child Semistructured Play	1.2	1.2	0.0	1.1	1.2	1.3	-0.1	-9.3
Intrusiveness During Parent-Child Semistructured Play	1.6	1.5	0.0	4.5	1.6	1.7	-0.1	-11.3
Detachment During Parent-Child Puzzle Challenge Task	1.5	1.5	0.0	1.1	1.7	1.7	0.0	0.3
Intrusiveness During Parent-Child Puzzle Challenge Task	2.6	2.7	-0.1	-8.2	2.4	2.4	-0.0	-1.6
Negative Regard During Parent-Child Semistructured Play	1.2	1.2	-0.1	-10.3	1.3	1.3	-0.0	-5.4
HOME Harshness	0.3	0.2	0.1	10.8	0.4	0.4	-0.0	-7.0
Percentage of Parents Who Spanked Child in the Past Week***	36.2	45.9	-9.7**	-19.5	54.9	61.8	-1.9	-3.9
Knowledge of Safety Practices and Discipline Strategies								
Percentage of Parents Who Usually Use a Car Seat Correctly***	75.2	75.1	0.1	0.2	64.1	61.8	2.3	5.1
Percentage of Parents Suggesting Physical Punishment as a Discipline Strategy***	32.1	33.4	-1.3	-2.6	62.6	60.4	2.2	4.3
Percentage of Parents Who Would Use Mild Discipline Only***	55.8	53.7	2.1	4.2	31.4	34.8	-3.4	-6.9
Index of Severity of Discipline Strategies	2.9	3.0	-0.1	-6.3	3.9	3.8	0.1	3.5
Parent Physical and Mental Health								
Parent's Health Status	3.3	3.3	0.0	3.3	3.4	3.6	-0.2	-14.8
Parenting Stress Index (PSI) Parental Distress	25.8	27.7	-1.9**	-20.2	23.6	25.1	-1.5	-15.7
PSI Parent-Child Dysfunctional Interaction	17.7	18.1	-0.4	-6.7	17.2	18.0	-0.8	-12.9
Center for Epidemiological Studies Depression (CES-D; Short Form)	7.7	8.2	-0.5	-7.3	7.8	7.4	0.4	5.0
CES-D Severe Depressive Symptoms ***	15.0	17.5	-2.5	-7.0	13.6	14.6	-1.0	-2.8
Family Environment Scale (FES): Family Conflict	1.8	1.7	0.1	8.6	1.6	1.7	-0.1	-17.0
Father Presence								
Currently Married to Biological Father ***	52.9	53.2	-0.4	-0.7	19.0	20.8	-1.9	-3.8
Biological Father is Currently Married to, Lives with, or is Boyfriend of Respondent***	63.5	69.4	-5.9	-11.8	38.8	39.3	-0.6	-1.1
Biological Father Currently Present in Child's Life***	77.2	80.0	-2.9	-6.4	67.3	70.6	-3.3	-7.5

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TABLE E.VI.7 (*continued*)

	Early or Late Implementers					Incomplete Implementers			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]		Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Continuous Biological Father Involvement Child Age 14-36 Months***	74.3	82.1	-7.8*	-17.0		58.2	65.3	-7.1	-15.4
No Biological Father Involvement Child Age 14-36 Months***	9.1	8.9	0.2	0.7		15.9	9.4	6.5	20.8
Continuous Male Involvement Child Age 14-36 Months***	81.4	91.3	-9.9***	-27.7		75.1	81.7	-6.7	-18.6
No Male Involvement Child Age 14-36 Months***	1.7	0.4	1.3	10.6		3.4	2.4	0.9	7.7
Sample Size									
Bayley	**303**	**259**	**562**			**199**	**189**	**388**	
Parent Interview	**261**	**225**	**486**			**135**	**123**	**258**	
Parent-Child Interactions	**246**	**213**	**459**			**150**	**137**	**287**	

SOURCE: Parent interviews, child assessments, interviewer observations, and assessment of semistructured parent-child interactions conducted when children were approximately 36 months old.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE E.VI.8

IMPACTS ON SELF-SUFFICIENCY AT 28 MONTHS, BY IMPLEMENTATION STATUS FOR HOME-BASED PROGRAMS

	Early or Late Implementers				Incomplete Implementers			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Education/Job Training								
Ever in Education or Training***[d]	46.5	46.3	0.2	0.4	63.2	41.6	21.6***	43.2
Ever in High School***	11.1	6.9	4.1*	14.5	14.5	5.3	9.2***	32.3
Ever in ESL Class***	5.7	4.2	1.5	10.6	0.4	-0.1	0.5	3.5
Ever in Vocational Program***	13.1	16.4	-3.3	-8.8	25.8	13.6	12.2**	32.3
Average Hours per Week in Education or Training	3.0	2.6	0.5	7.6	6.6	3.0	3.7***	57.8
In Education or Training:								
1st Quarter***	18.4	19.3	-0.9	-2.2	25.2	22.0	3.2	7.7
2nd Quarter***	21.7	19.0	2.7	6.3	29.9	25.5	4.4	10.3
3rd Quarter***	21.8	23.5	-1.8	-4.0	37.5	28.0	9.5**	21.6
4th Quarter***	23.4	19.9	3.5	8.1	32.7	23.4	9.3**	21.7
5th Quarter***	23.9	21.7	2.1	5.0	35.6	22.7	12.9***	30.0
6th Quarter***	21.5	22.7	-1.2	-2.8	38.6	18.7	19.9***	47.9
7th Quarter***	19.2	19.3	-0.1	-0.3	28.6	13.6	15.0***	37.3
8th Quarter***	20.9	15.9	4.9	12.5	29.4	15.7	13.7***	34.8
Have High School Diploma***	39.1	40.2	-1.2	-2.3	62.4	53.3	9.1*	18.2
Have GED***	7.9	6.1	1.9	5.9	9.6	19.2	-9.6**	-30.2
Employment								
Ever Employed***	79.0	80.3	-1.3	-3.6	89.5	83.1	6.4	17.0
Average Hours/Week Employed	13.9	14.3	-0.4	-2.6	16.2	15.9	0.4	2.6
Employed in:								
1st Quarter***	34.1	33.6	0.5	1.0	33.6	38.2	-4.6	-9.5
2nd Quarter***	37.1	41.3	-4.1	-8.3	39.4	43.6	-4.2	-8.3
3rd Quarter***	43.7	48.1	-4.4	-8.8	51.1	52.3	-1.2	-2.5
4th Quarter***	48.7	48.9	-0.2	-0.3	56.4	53.5	2.9	5.7
5th Quarter***	55.6	56.7	-1.1	-2.2	61.1	59.8	1.3	2.7
6th Quarter***	57.7	54.1	3.5	7.2	67.6	63.0	4.6	9.3
7th Quarter***	57.1	56.7	0.4	0.9	58.6	52.6	6.1	12.3
8th Quarter***	55.1	58.3	-3.2	-6.5	57.6	62.0	-4.4	-8.9
Any Self-Sufficiency-Oriented Activity (Education, Training, or Employment)								
Ever Employed or in Education/Training***	87.1	87.6	-0.5	-1.6	96.4	88.4	7.9***	26.2
Average Hours per Week in Any Activity	17.5	17.0	0.4	2.8	23.5	19.6	3.9**	24.5
In Activities in:								
1st Quarter***	44.4	44.9	-0.6	-1.1	51.3	50.5	0.8	1.6
2nd Quarter***	48.5	51.9	-3.4	-6.8	60.1	57.3	2.8	5.7
3rd Quarter***	53.9	59.0	-5.0	-10.6	74.0	65.6	8.3*	17.6
4th Quarter***	60.0	57.6	2.4	5.1	72.7	63.0	9.6**	20.2
5th Quarter***	65.2	65.2	-0.0	-0.1	76.1	69.3	6.8	14.6
6th Quarter***	65.9	63.4	2.5	5.2	82.8	68.8	13.9***	29.7
7th Quarter***	64.0	53.6	0.4	0.9	70.4	60.8	9.6*	20.1
8th Quarter***	62.6	64.1	-1.6	-3.3	69.7	68.9	0.8	1.8

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TABLE E.VI.8 (*continued*)

Outcome	Early or Late Implementers Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Incomplete Implementers Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
AFDC/TANF Receipt								
Ever Received AFDC/TANF***	44.8	42.1	2.7	5.4	69.7	65.7	4.0	8.0
Received AFDC/TANF in:								
1st Quarter***	34.6	31.0	3.6	7.8	52.8	49.7	3.1	6.5
2nd Quarter***	33.6	32.0	1.6	3.4	53.4	55.5	-2.1	-4.4
3rd Quarter***	35.4	34.3	1.2	2.4	61.1	55.5	5.6	11.7
4th Quarter***	28.8	30.1	-1.1	-2.7	48.9	48.6	0.2	0.5
5th Quarter***	28.0	29.1	-1.1	-2.4	47.0	49.1	-2.2	-4.7
6th Quarter***	29.6	28.0	1.6	3.4	46.4	51.6	-5.2	-11.3
7th Quarter***	23.7	21.2	2.4	5.6	33.3	44.0	-10.7**	-24.3
8th Quarter***	24.0	18.3	5.7*	13.5	33.7	38.5	-4.9	-11.5
Total AFDC/TANF Benefits ($)	$2,394	$2,535	-$141	-3.7	$3,108	$3,172	-$64	-1.7
Receipt of Other Welfare Benefits								
Ever Received Welfare***	63.9	62.7	1.2	2.6	85.2	79.6	5.6*	11.9
Total Welfare Benefits ($)	$5,186	$5,559	-$373	-4.9	$6,886	$6,785	$101	1.3
Ever Received Food Stamps***	57.8	58.5	-0.7	-1.5	78.4	74.8	3.7	7.5
Total Food Stamp Benefits ($)	$1,753	$1,660	$93	3.4	$3,024	$2,758	$265	9.7
Income/Poverty								
Income Above Poverty Level***	42.8	44.9	-2.2	-4.4	38.8	37.9	0.9	1.8
Subsequent Births								
Subsequent Birth by 24 Months after Random Assignment***	26.5	26.2	0.3	0.6	25.9	31.3	-5.4	-12.0
Sample Size	287	276	563		201	177	378	

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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TABLE E.VI.9

IMPACTS ON CHILD AND FAMILY OUTCOMES AT AGE 3, BY IMPLEMENTATION STATUS OF ALL SERVICES

	Strong Full Implementation					Not Strong or Not Full Implementation			
Outcome	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c		Program Group Particiapants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c
Child Cognitive and Language Development									
Bayley Mental Development Index (MDI) Standard Score**^{d}	93.7	89.8	4.0***	30.6		90.7	90.1	0.7	5.2
Percentage with MDI < 85***	25.2	33.0	-7.8	-16.8		27.9	31.5	-3.6	-7.7
PPVT-III Standard Score	84.5	83.6	0.9	5.5		82.8	80.6	2.2**	13.6
Percentage with PPVT-III < 85***	47.4	55.7	-8.3	-16.6		52.3	57.2	-4.9	-9.8
Child Social-Emotional Development									
Engagement of Parent During Parent-Child Semistructured Play	4.9	4.6	0.3**	26.3		4.8	4.6	0.2***	22.7
Sustained Attention with Objects During Parent-Child Semistructured Play	5.1	4.9	0.3**	25.0		4.9	4.8	0.1**	14.2
Engagement of Parent During Parent-Child Puzzle Challenge Task	5.1	4.9	0.2	19.8		5.0	4.9	0.1	5.2
Persistence During Parent-Child Puzzle Challenge Task	4.6	4.6	0.1	4.3		4.5	4.4	0.1	8.4
Bayley Behavioral Rating Scale (BRS): Emotional Regulation	4.1	4.1	-0.0	-2.8		4.0	4.0	0.0	0.3
Bayley BRS: Orientation/ Engagement	4.0	4.1	-0.0	-2.3		3.8	3.8	0.1	6.5
Negativity Toward Parent During Parent-Child Semistructured Play	1.2	1.3	-0.1	-14.2		1.3	1.3	-0.1*	-12.2
Frustration During Parent-Child Puzzle Challenge Task	2.8	2.9	-0.1	-4.0		2.7	2.6	0.1	4.0
Child Behavior Checklist—Aggressive Behavior	11.6	12.8	-1.2	-18.3		10.3	11.1	-0.7**	-11.5
Child Health Status									
Child's Health Status	4.0	4.1	-0.1	-9.0		4.0	4.0	0.0	1.2
Percentage of Children in Fair or Poor Health***	6.8	8.1	-1.3	-4.5		8.5	9.0	-0.4	-1.5
Quality of the Home Environment and Parenting: Overall and Physical Environment									
Home Observation for Measurement of the Environment (HOME) Total Score*	28.4	27.2	1.3**	26.2		27.3	27.0	0.3	5.8
HOME Internal Physical Environment	7.9	7.8	0.1	6.7		7.8	7.8	-0.0	-2.5
Parenting Behavior: Emotional Support									
HOME Warmth	2.5	2.4	0.2	17.8		2.6	2.5	0.1	6.0
Supportiveness During Parent-Child Semistructured Play	4.1	4.0	0.1	12.4		4.0	3.8	0.2***	17.1
Supportive Presence During Parent-Child Puzzle Challenge Task	4.9	4.7	0.2	14.0		4.3	4.3	0.0	1.3
Parenting Behavior: Stimulation of Language and Learning									
Percentage of Children with a Regular Bedtime***	64.5	64.0	0.5	1.0		58.0	56.6	1.4	2.9
Percentage of Children Who Follow a Bedtime Routine***	74.3	71.0	3.3	7.1		67.8	68.5	-0.7	-1.5
HOME: Support of Language and Learning	10.8	10.5	0.3	12.5		10.6	10.4	0.2	7.1

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TABLE E.VI.9 (*continued*)

	Strong Full Implementation				Not Strong or Not Full Implementation			
Outcome	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Particiapants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c
Parent-Child Play	4.5	4.2	0.3***	34.5	4.4	4.4	0.0	5.3
Quality of Assistance During Parent-Child Puzzle Challenge Task	3.9	3.9	0.0	3.1	3.5	3.4	0.1	9.4
Percentage of Parents Who Read to Child Daily***	64.3	48.2	16.1***	32.3	54.7	51.1	3.6	7.1
Percentage of Parents Who Read to Child at Bedtime***	43.4	33.7	9.7*	21.4	29.0	27.5	1.5	3.3
Parenting Behavior: Negative Parenting Behavior								
Detachment During Parent-Child Semistructured Play	1.2	1.3	-0.0	-5.5	1.2	1.3	-0.1*	-11.7
Intrusiveness During Parent-Child Semistructured Play*	1.4	1.6	-0.2**	-23.5	1.7	1.7	-0.0	-1.1
Detachment During Parent-Child Puzzle Challenge Task	1.5	1.6	-0.0	-4.6	1.7	1.7	0.0	1.0
Intrusiveness During Parent-Child Puzzle Challenge Task	2.4	2.6	-0.2	-14.0	2.7	2.8	-0.1	-5.0
Negative Regard During Parent-Child Semistructured Play	1.2	1.3	-0.1	-9.4	1.3	1.3	0.0	1.3
HOME Harshness	0.1	0.1	-0.0	-6.2	0.3	0.3	0.0	5.5
Percentage of Parents Who Spanked Child in the Past Week***	45.9	55.4	-9.5*	-19.1	47.0	54.6	-7.6***	-15.2
Knowledge o Safety Practices and Discipline Strategies								
Percentage of Parents Who Usually Use a Car Seat Correctly***	74.1	73.9	0.2	0.5	68.6	71.8	-3.2	-7.1
Percentage of Parents Suggesting Physical Punishment as a Discipline Strategy***	34.8	51.1	-16.4***	-32.7	49.8	53.3	-3.8	-7.6
Percentage of Parents Who Would Use Mild Discipline Only***	56.8	41.9	14.9***	30.3	41.0	37.7	3.2	6.6
Index of Severity of Discipline Strategies***	3.0	3.6	-0.6***	-36.1	3.5	3.6	-0.1*	-8.9
Parent Physical and Mental Health								
Parent's Health Status	3.4	3.5	-0.1	-9.7	3.5	3.5	-0.0	-1.3
Parenting Stress Index (PSI) Parental Distress	24.4	25.4	-1.0	-10.4	24.8	25.4	-0.6	-6.5
PSI Parent-Child Dysfunctional Interaction	18.4	18.1	0.3	4.7	17.6	17.8	-0.2	-3.1
Center for Epidemiological Studies Depression (CES-D; Short Form)	7.9	8.6	-0.7	-9.9	7.2	7.4	-0.2	-2.7
CES-D Severe Depressive Symptoms ***	17.0	16.9	0.1	0.2	13.7	14.1	-0.4	-1.0
Family Environment Scale (FES): Family Conflict	1.7	1.7	-0.1	-16.2	1.7	1.7	0.0	0.0
Father Presence								
Currently Married to Biological Father ***	46.5	47.4	-0.9	-1.9	31.0	33.1	-2.1	-4.3
Biological Father is Currently Married to, Lives with, or is Boyfriend of Respondent***	54.7	58.8	-4.0	-8.1	47.1	48.9	-1.8	-3.6
Biological Father Currently Present in Child's Life***	73.9	72.0	1.9	4.2	73.3	71.5	0.8	1.7

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TABLE E.VI.9 (*continued*)

	Strong Full Implementation				Not Strong or Not Full Implementation			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Particiapants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Continuous Biological Father Presence Age 14-36 Months***	68.1	70.5	-2.4	-5.2	67.0	67.9	-0.9	-2.0
No Biological Father Presence Age 14-36 Months***	14.5	10.2	4.2	13.5	11.6	12.5	-0.9	-2.9
Continuous Male Presence Age 14-36 Months***	80.3	80.2	0.0	0.1	79.5	83.7	-4.3*	-11.9
No Male Presence Age 14-36 Months***	2.3	1.5	0.8	6.7	2.2	1.8	0.4	3.3
Sample Size **Bayley** **Parent Interview** **Parent-Child Interactions**	 **203** **253** **201**	 **202** **240** **193**	 **405** **493** **394**		 **676** **854** **673**	 **577** **763** **591**	 **1,253** **1,617** **1,264**	

SOURCE: Parent interviews, child assessments, interviewer observations, and assessments of semistructured parent-child interactions conducted when children were approximately 36 months old.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE E.VI.10

IMPACTS ON SELF-SUFFICIENCY AT 28 MONTHS, BY IMPLEMENTATION STATUS OF ALL SERVICES

	Strong Full Implementation				Not Strong or Not Full Implementation			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Education/Job Training								
Ever in Education or Training***[d]	52.5	48.5	4.0	8.0	62.3	52.7	9.6***	19.2
Ever in High School***	7.0	4.8	2.2	7.7	15.7	10.4	5.3***	18.5
Ever in ESL Class***	1.7	2.6	-0.9	-6.1	4.1	2.8	1.2	8.5
Ever in Vocational Program***	17.8	14.1	3.7	9.9	20.7	17.6	3.1	8.2
Average Hours per Week in Education or Training	2.5	2.6	-0.1	-1.9	5.3	3.7	1.5***	24.3
In Education or Training:								
1st Quarter***	20.2	16.8	3.4	8.3	23.0	23.9	-0.9	-2.2
2nd Quarter***	21.6	19.4	2.2	5.2	28.8	26.7	2.2	5.1
3rd Quarter***	21.7	21.9	-0.3	-0.6	34.4	28.5	5.9**	13.4
4th Quarter***	24.8	20.2	4.6	10.8	32.9	26.5	6.4***	14.9
5th Quarter***	22.2	21.8	0.4	1.0	33.2	26.5	6.7***	15.5
6th Quarter***	21.4	19.5	1.9	4.7	32.3	24.1	8.1***	19.6
7th Quarter***	17.9	16.5	1.4	3.5	28.8	22.4	6.4**	15.9
8th Quarter***	18.4	15.3	3.1	7.9	29.0	21.3	7.7***	19.6
Have High School Diploma ***	62.9	56.5	6.4	12.9	46.4	47.5	-1.1	-2.2
Have GED***	11.7	10.3	1.4	4.3	9.4	11.5	-2.1	-6.6
Employment								
Ever Employed***	89.1	82.3	6.8*	18.1	86.1	83.9	2.2	5.8
Average Hours/Week Employed	18.0	15.8	2.2	14.9	16.9	17.4	-0.6	-3.7
Employed in:								
1st Quarter***	44.6	42.2	2.5	5.1	37.3	37.9	-0.7	-1.4
2nd Quarter***	54.1	47.3	6.8	13.6	43.1	44.8	-1.8	-3.5
3rd Quarter***	63.6	53.2	10.4**	20.8	49.8	52.1	-2.3	-4.6
4th Quarter***	65.5	55.5	10.0**	21.1	54.1	54.4	-0.3	-0.5
5th Quarter***	68.7	58.3	10.4**	21.1	59.3	59.5	-0.2	-0.5
6th Quarter***	68.3	56.1	12.2**	24.7	62.8	60.0	2.8	5.6
7th Quarter***	59.7	54.9	4.7	9.5	60.4	57.6	2.8	5.7
8th Quarter***	65.0	58.2	6.9	14.0	62.9	62.2	0.7	1.3
Any Self-Sufficiency-Oriented Activity (Education, Training or Employment)								
Ever Employed or in Education/Training***	92.7	90.6	2.2	7.1	94.3	90.8	3.5**	11.5
Average Hours per Week in Any Activity	20.7	19.1	1.6	10.1	22.9	21.6	1.3	7.9
In Activities in:								
1st Quarter***	56.2	52.7	3.5	7.0	52.7	52.5	0.3	0.5
2nd Quarter***	63.4	57.5	6.0	12.1	62.1	58.8	3.3	6.7
3rd Quarter***	71.9	67.0	4.9	10.3	69.8	66.2	3.5	7.4
4th Quarter***	76.0	64.6	11.4***	23.8	71.2	66.5	4.7**	9.9
5th Quarter***	76.0	69.7	6.3	13.7	74.0	69.9	4.1*	8.9
6th Quarter***	74.4	66.3	8.1*	17.1	77.7	68.6	9.1***	19.4
7th Quarter***	67.4	63.9	3.6	7.5	73.1	66.1	7.0***	14.6
8th Quarter***	71.4	64.3	7.1	15.3	75.0	70.4	4.6*	9.9

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TABLE E.VI.10 (*continued*)

	Strong Full Implementation				Not Strong or Not Full Implementation			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
AFDC/TANF Receipt								
Ever Received AFDC/TANF***	34.3	35.8	-1.5	-3.1	50.9	47.2	3.7*	7.5
Received AFDC/TANF in:								
1st Quarter***	25.2	23.9	1.3	2.9	36.5	33.1	3.4*	7.2
2nd Quarter***	25.7	24.8	0.9	1.9	37.1	35.4	1.6	3.4
3rd Quarter***	26.5	25.0	1.5	3.2	39.8	37.5	2.3	4.7
4th Quarter***	20.4	19.7	0.8	1.6	33.5	32.7	0.8	1.8
5th Quarter***	17.9	21.5	-3.6	-7.8	33.3	31.6	1.6	3.5
6th Quarter***	16.4	23.3	-6.9*	-14.8	32.7	32.9	-0.2	-0.4
7th Quarter***	15.6	18.7	-3.1	-6.9	24.8	28.9	-4.1*	-9.4
8th Quarter***	14.2	18.1	-3.9	-9.1	24.4	25.3	-0.9	-2.1
Total AFDC/TANF Benefits ($)*	$1,558	$1,688	-$130	-3.4	$2,325	$2,354	-$29	-0.8
Receipt of Other Welfare Benefits								
Ever Received Welfare***	63.8	60.5	3.2	6.9	69.7	67.4	2.3	4.9
Total Welfare Benefits ($)*	$4,443	$5,158	-$715	-9.4	$5,574	$5,837	-$263	-3.5
Ever Received Food Stamps***	56.1	56.2	-0.0	-0.1	62.2	59.8	2.4	5.0
Total Food Stamp Benefits ($)	$2,041	$2,287	-$246	-9.0	$2,142	$2,090	$51	1.9
Income/Poverty								
Income Above Poverty Level***	42.4	42.8	-0.4	-0.7	43.0	43.7	-0.7	-1.4
Subsequent Births								
Subsequent Birth by 24 Months after Random Assignment***	24.2	26.2	-2.0	-4.4	22.4	27.6	-5.1*	-11.4
Sample Size	255	254	509		821	757	1,578	

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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TABLE E.VI.11

IMPACTS ON CHILD AND FAMILY OUTCOMES AT AGE 3, BY WORK REQUIREMENTS FOR MOTHERS RECEIVING AFDC/TANF

	Mothers of Children Under 1 Required to Work				Mothers of Children Under 1 Not Required to Work			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Child Cognitive and Language Development								
Bayley Mental Development Index (MDI) Standard Score	92.5	91.0	1.5*	11.9	90.6	89.0	1.6*	12.7
Percentage with MDI < 85***[d]	24.2	28.3	-4.1	-8.8	29.6	34.7	-5.1	-10.9
Peabody Picture Vocabulary Test (PPVT)-III Standard Score	84.4	83.5	0.9	5.2	82.4	79.0	3.4***	20.6
Percentage with PPVT-III < 85***	45.5	50.3	-4.8	-9.5	55.9	64.2	-8.4**	-16.8
Child Social-Emotional Development								
Engagement of Parent During Parent-Child Semistructured Play	4.9	4.7	0.2**	16.3	4.8	4.5	0.3***	24.8
Sustained Attention with Objects During Parent-Child Semistructured Play	5.0	4.9	0.1*	12.7	4.9	4.7	0.2***	19.8
Engagement of Parent During Parent-Child Puzzle Challenge Task	5.0	5.0	0.0	1.6	5.0	4.9	0.1**	15.0
Persistence During Parent-Child Puzzle Challenge Task	4.7	4.5	0.2*	13.7	4.5	4.4	0.0	2.7
Bayley Behavioral Rating Scale (BRS): Emotional Regulation	4.0	4.0	0.0	5.7	4.0	4.0	-0.0	-1.6
Bayley BRS: Orientation/ Engagement	3.9	3.9	0.1	6.2	3.8	3.8	0.0	2.5
Negativity Toward Parent During Parent-Child Semistructured Play	1.2	1.3	-0.1**	-16.6	1.3	1.4	-0.1*	-13.8
Frustration During Parent-Child Puzzle Challenge Task	2.7	2.8	-0.0	-2.2	2.7	2.6	0.1	7.5
Child Behavior Checklist—Aggressive Behavior**	11.2	11.0	0.2	3.3	10.2	11.6	-1.4***	-21.5
Child Health Status								
Child's Health Status	4.1	4.1	-0.0	-2.7	4.0	4.0	-0.0	-1.7
Percentage of Children in Fair or Poor Health***	6.4	7.0	-0.7	-2.3	9.2	9.7	-0.5	-1.8
Quality of the Home Environment and Parenting: Overall and Physical Environment								
Home Observation for Measurement of the Environment (HOME) Total Score	27.4	27.2	0.2	3.9	27.7	27.0	0.7**	14.2
HOME Internal Physical Environment	7.7	7.8	-0.1	-4.0	7.9	7.9	-0.0	-0.1
Parenting Behavior: Emotional Support								
HOME Warmth	2.5	2.4	0.1	11.8	2.6	2.5	0.1	7.5
Supportiveness During Parent-Child Semistructured Play	4.1	4.0	0.1	11.6	4.0	3.8	0.2**	17.6
Supportive Presence During Parent-Child Puzzle Challenge Task**	4.6	4.7	-0.1	-9.9	4.4	4.2	0.2**	17.5
Parenting Behavior: Stimulation of Language and Learning								
Percentage of Children with a Regular Bedtime***	63.0	58.1	4.9	9.9	57.0	57.5	-0.5	-0.9
Percentage of Children Who Follow a Bedtime Routine***	74.2	72.2	2.0	4.4	65.8	65.1	0.7	1.4

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TABLE E.VI.11 (*continued*)

	Mothers of Children Under 1 Required to Work				Mothers of Children Under 1 Not Required to Work			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
HOME: Support of Language and Learning	10.8	10.6	0.2	7.2	10.5	10.3	0.2*	11.0
Parent-Child Play	4.5	4.4	0.1**	15.0	4.4	4.3	0.0	5.4
Quality of Assistance During Parent-Child Puzzle Challenge Task	3.7	3.6	0.1	4.4	3.5	3.3	0.2**	16.9
Percentage of Parents Who Read to Child Daily***	63.1	55.3	7.9**	15.7	52.2	48.6	3.5	7.1
Percentage of Parents Who Read to Child at Bedtime***	39.1	33.2	5.9*	12.9	27.4	26.3	1.1	2.5
Parenting Behavior: Negative Parenting Behavior								
Detachment During Parent-Child Semistructured Play	1.2	1.2	-0.0	-4.3	1.2	1.3	-0.1	-12.0
Intrusiveness During Parent-Child Semistructured Play	1.4	1.5	-0.1**	-15.0	1.7	1.7	-0.0	-0.3
Detachment During Parent-Child Puzzle Challenge Task	1.7	1.6	0.1	5.8	1.6	1.7	-0.1	-8.7
Intrusiveness During Parent-Child Puzzle Challenge Task	2.5	2.6	-0.1	-7.7	2.8	2.8	-0.1	-3.7
Negative Regard During Parent-Child Semistructured Play	1.2	1.3	-0.0	-7.4	1.3	1.3	0.0	1.8
HOME Harshness	0.4	0.3	0.1	10.4	0.2	0.2	-0.0	-1.2
Percentage of Parents Who Spanked Child in the Past Week***	46.2	55.3	-9.1**	-18.2	47.0	53.0	-6.0*	-12.0
Knowledge of Safety Practices and Discipline Strategies								
Percentage of Parents Who Usually Use a Car Seat Correctly***	75.1	77.0	-1.9	-4.1	66.3	66.5	-0.3	-0.6
Percentage of Parents Suggesting Physical Punishment as a Discipline Strategy***	39.8	47.5	-7.7**	-15.4	50.9	52.7	-1.8	-3.6
Percentage of Parents Who Would Use Mild Discipline Only***	50.3	44.7	5.7*	11.5	40.6	38.0	2.5	5.1
Index of Severity of Discipline Strategies	3.2	3.4	-0.2**	-13.9	3.5	3.6	-0.1	-7.1
Parent Physical and Mental Health								
Parent's Health Status	3.5	3.5	-0.0	-1.9	3.4	3.5	-0.1	-9.1
Parenting Stress Index (PSI) Parental Distress**	25.1	24.4	0.6	6.5	24.5	26.1	-1.5**	-15.9
PSI Parent-Child Dysfunctional Interaction***	18.1	17.1	1.1**	17.1	17.5	18.1	-0.6	-10.2
Center for Epidemiological Studies Depression (CES-D; Short Form)	8.7	8.3	0.4	5.1	6.5	7.1	-0.5	-7.3
CES-D Severe Depressive Symptoms***	17.3	15.2	2.2	6.0	12.8	13.5	-0.8	-2.1
Family Environment Scale (FES): Family Conflict	1.6	1.7	-0.0	-7.0	1.7	1.7	-0.0	-1.1
Father Presence								
Currently Married to Biological Father***	35.7	39.2	-3.5	-7.2	33.8	33.6	0.1	0.3
Biological Father is Currently Married to, Lives with, or is Boyfriend of Respondent***	47.3	52.3	-4.9	-9.9	50.1	49.7	0.4	0.9

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TABLE E.VI.11 *(continued)*

	Mothers of Children Under 1 Required to Work				Mothers of Children Under 1 Not Required to Work			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Biological Father Currently Present in Child's Life***	69.2	71.1	-1.9	-4.2	75.2	70.9	4.3	9.5
Continuous Biological Father Presence Child Age 14-36 Months***	65.0	69.7	-4.7	-10.3	68.8	68.1	0.7	1.5
No Biological Father Presence Child Age 14-36 Months	13.5	13.4	0.1	0.3	11.4	11.3	0.1	0.4
Continuous Male Presence Child Age 14-36 Months***	79.2	86.4	-7.3**	-20.3	79.9	80.9	-1.0	-2.7
No Male Presence Child Age 14-36 Months***	2.0	2.0	0.0	0.1	2.4	1.6	0.8	6.6
Sample Size **Bayley** **Parent Interview** **Parent-Child Interactions**	 **401** **515** **425**	 **335** **438** **352**	 **736** **953** **777**		 **478** **592** **449**	 **444** **565** **432**	 **922** **1,157** **881**	

SOURCE: Parent interviews, child assessments, interviewer observations, and assessments of semistructured parent-child interactions conducted when children were approximately 36 months old.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE E.VI.12

IMPACTS ON SELF-SUFFICIENCY AT 28 MONTHS, BY WORK REQUIREMENTS FOR MOTHERS RECEIVING AFDC/TANF

	Mothers of Children Under 1 Required to Work				Mothers of Children Under 1 Not Required to Work			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Education/Job Training								
Ever in Education or Training***[d]	60.9	54.5	6.4*	12.7	59.5	48.9	10.7***	21.3
Ever in High School***	9.5	6.8	2.7	9.6	16.5	10.3	6.2***	21.6
Ever in ESL Class***	1.8	2.5	-0.7	-4.7	4.8	2.7	2.0*	14.2
Ever in Vocational Program***	19.8	18.5	1.2	3.2	20.1	16.6	3.5	9.3
Average Hours per Week in Education or Training	4.3	3.3	1.0**	16.1	4.8	3.7	1.1**	17.9
In Education or Training:								
1st Quarter***	24.9	23.9	1.0	2.4	20.6	21.6	-1.0	-2.4
2nd Quarter***	29.0	27.4	1.6	3.7	25.7	24.0	1.8	4.1
3rd Quarter***	31.6	27.4	4.2	9.5	31.6	26.0	5.5**	12.6
4th Quarter***	32.6	24.8	7.8***	18.3	29.8	25.9	3.9	9.2
5th Quarter***	32.9	25.1	7.8***	18.2	29.0	26.2	2.8	6.5
6th Quarter***	30.4	23.8	6.6**	15.9	29.3	22.3	6.9**	16.7
7th Quarter***	23.7	23.5	0.2	0.4	28.1	19.7	8.4***	20.9
8th Quarter***	25.6	23.1	2.6	6.5	27.2	17.6	9.6***	24.5
Have High School Diploma***	55.0	60.0	-5.0*	-10.1	47.1	42.8	4.4	8.7
Have GED***	12.4	13.4	-1.0	-3.1	8.6	9.4	-0.8	-2.6
Employment								
Ever Employed***	90.6	91.9	-1.2	-3.2	84.0	78.6	5.3*	14.2
Average Hours/Week Employed	20.6	20.4	0.2	1.5	14.7	14.5	0.2	1.1
Employed in:								
1st Quarter***	51.7	50.6	1.1	2.3	30.0	30.3	-0.3	-0.6
2nd Quarter***	56.4	57.7	-1.3	-2.7	38.1	36.9	1.3	2.6
3rd Quarter***	62.8	64.9	-2.1	-4.3	46.0	43.8	2.2	4.4
4th Quarter***	66.7	67.1	-0.4	-0.7	49.8	47.1	2.7	5.3
5th Quarter***	72.1	70.3	1.8	3.6	53.9	52.9	1.0	2.1
6th Quarter***	73.3	70.7	2.6	5.3	57.3	51.9	5.4	10.9
7th Quarter***	69.2	65.7	3.5	7.1	53.7	52.4	1.4	2.8
8th Quarter***	71.5	69.5	2.0	4.1	57.5	55.9	1.6	3.3
Any Self-Sufficiency-Oriented Activity (Education, Training or Employment)								
Ever Employed or in Education/Training***	95.8	96.2	-0.4	-1.4	92.5	87.3	5.2**	17.1
Average Hours per Week in Any Activity	25.4	24.1	1.3	8.0	20.2	18.7	1.6	10.1
In Activities in:								
1st Quarter***	64.3	63.3	1.1	2.2	45.9	44.8	1.1	2.2
2nd Quarter***	71.2	70.2	1.0	2.0	56.2	51.0	5.2*	10.5
3rd Quarter***	76.9	77.5	-0.6	-1.3	65.7	58.5	7.2**	15.2
4th Quarter***	79.8	76.6	3.2	6.7	67.1	59.6	7.5	15.6
5th Quarter***	82.6	80.0	2.6	5.6	68.6	64.3	4.2	9.2
6th Quarter***	82.7	78.4	4.3	9.2	72.6	61.7	11.0***	23.4
7th Quarter***	77.2	74.8	2.4	5.0	67.7	60.8	6.9**	14.5
8th Quarter***	79.8	76.9	2.9	6.3	70.0	63.5	6.5**	13.9

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TABLE E.VI.12 (*continued*)

	Mothers of Children Under 1 Required to Work					Mothers of Children Under 1 Not Required to Work			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]		Program Group Participants	Control Group[a]	Impact Estimate per Participant[a]	Effect Size[c]
AFDC/TANF Receipt									
Ever Received AFDC/TANF***	40.0	34.4	5.6**	11.2		51.7	52.3	-0.6	-1.1
Received AFDC/TANF in:									
1st Quarter***	26.7	23.8	2.8	6.0		38.9	36.0	2.9	6.2
2nd Quarter***	26.4	23.4	2.9	6.1		40.0	39.6	0.4	0.9
3rd Quarter***	26.8	23.0	3.8	8.0		43.4	42.3	1.1	2.2
4th Quarter***	21.4	18.9	2.5	5.4		36.7	36.8	-0.1	-0.2
5th Quarter***	22.0	17.3	4.7*	10.3		34.9	36.8	-1.9	-4.0
6th Quarter***	21.4	16.7	4.8*	10.3		34.1	38.4	-4.4	-9.4
7th Quarter***	17.5	15.0	2.4	5.5		26.4	32.9	-6.4**	-14.6
8th Quarter***	17.6	13.4	4.2*	9.8		25.2	29.1	-4.0	-9.4
Total AFDC/TANF Benefits ($)	$1,290	$1,095	$195	5.1		$2,754	$2,859	-$105	-2.7
Receipt of Other Welfare Benefits									
Ever Received Welfare***	66.5	61.9	4.7*	9.9		69.1	70.1	-1.0	-2.1
Total Welfare Benefits ($)***	$4,695	$3,774	$921*	12.2		$5,745	$6,802	-$1,057**	-14.0
Ever Received Food Stamps***	58.4	56.3	2.1	4.3		62.2	61.6	0.6	1.2
Total Food Stamp Benefits ($)	$1,795	$1,662	$133	4.9		$2,330	$2,324	$6	0.2
Income/Poverty									
Income Above Poverty Level***	43.9	50.5	-6.6*	-13.3		42.5	37.8	4.7	9.5
Subsequent Births									
Subsequent Birth by 24 Months after Random Assignment***	23.3	27.2	-3.9	-8.7		22.6	27.2	-4.6	-10.2
Sample Size	**468**	**438**	**906**			**608**	**573**	**1,181**	

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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TABLE E.VI.13

IMPACTS ON CHILD AND FAMILY OUTCOMES AT AGE 3, BY WHETHER PROGRAM IS LOCATED IN AN URBAN AREA

	Urban Sites				Rural or Non-Urban Sites			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Child Cognitive and Language Development								
Bayley Mental Development Index (MDI) Standard Score	92.1	90.6	1.5**	11.7	89.9	87.7	2.2*	17.3
Percentage with MDI < 85***[d]	24.6	30.4	-5.7*	-12.3	33.6	36.0	-2.4	-5.2
Peabody Picture Vocabulary Test (PPVT)-III Standard Score	83.7	81.1	2.7**	16.2	82.0	80.3	1.7	10.1
Percentage with PPVT-III < 85***	48.3	56.2	-7.9**	-15.8	58.9	63.1	-4.1	-8.3
Child Social-Emotional Development								
Engagement of Parent During Parent-Child Semistructured Play	4.8	4.6	0.2***	22.0	4.8	4.6	0.2*	18.1
Sustained Attention with Objects During Parent-Child Semistructured Play	5.0	4.8	0.2***	17.9	4.9	4.8	0.2	15.7
Engagement of Parent During Parent-Child Puzzle Challenge Task	5.0	5.0	0.1	6.6	5.0	4.8	0.2*	16.8
Persistence During Parent-Child Puzzle Challenge Task	4.6	4.5	0.1	7.4	4.6	4.5	0.1	7.8
Bayley Behavioral Rating Scale (BRS): Emotional Regulation	4.0	4.0	-0.0	-1.9	4.1	4.1	0.0	1.6
Bayley BRS: Orientation/ Engagement	3.9	3.9	-0.0	-2.9	3.8	3.7	0.2**	20.5
Negativity Toward Parent During Parent-Child Semistructured Play	1.3	1.3	-0.1	-10.6	1.2	1.3	-0.1	-11.3
Frustration During Parent-Child Puzzle Challenge Task	2.7	2.7	-0.0	-0.5	2.6	2.5	0.2	13.0
Child Behavior Checklist—Aggressive Behavior	10.6	11.5	-0.9**	-13.7	10.7	11.1	-0.3	-4.8
Child Health Status								
Child's Health Status	4.0	4.1	-0.1	-6.2	4.1	4.0	0.1	9.2
Percentage of Children in Fair or Poor Health***	8.3	8.2	0.1	0.3	7.3	9.4	-2.1	-7.4
Quality of the Home Environment and Parenting: Overall and Physical Environment								
Home Observation for Measurement of the Environment (HOME) Total Score	27.6	27.1	0.6**	11.3	27.5	27.0	0.5	9.8
HOME Internal Physical Environment	7.8	7.7	0.0	2.1	7.9	8.0	-0.1	-4.6
Parenting Behavior: Emotional Support								
HOME Warmth	2.6	2.5	0.1	7.4	2.6	2.5	0.1	8.6
Supportiveness During Parent-Child Semistructured Play	4.0	3.9	0.1**	13.7	4.0	3.8	0.2*	17.1
Supportive Presence During Parent-Child Puzzle Challenge Task	4.5	4.4	0.1	8.2	4.3	4.4	-0.1	-5.3
Parenting Behavior: Stimulation of Language and Learning								
Percentage of Children with a Regular Bedtime***	57.3	58.8	-1.4	-2.9	64.2	57.6	6.5	13.2
Percentage of Children Who Follow a Bedtime Routine***	68.9	68.1	0.8	1.7	70.2	70.5	-0.2	-0.5

TABLE E.VI.13 *(continued)*

	Urban Sites				Rural or Non-Urban Sites			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
HOME: Support of Language and Learning	10.7	10.5	0.2*	10.2	10.4	10.2	0.2	9.2
Parent-Child Play	4.4	4.3	0.0	4.1	4.5	4.3	0.2**	21.7
Quality of Assistance During Parent-Child Puzzle Challenge Task	3.6	3.4	0.2**	15.1	3.5	3.5	0.0	1.8
Percentage of Parents Who Read to Child Daily***	56.5	52.6	3.8	7.7	58.1	50.1	8.0*	16.0
Percentage of Parents Who Read to Child at Bedtime***	31.7	29.9	1.8	3.9	33.9	27.0	6.8	15.0
Parenting Behavior: Negative Parenting Behavior								
Detachment During Parent-Child Semistructured Play	1.2	1.3	-0.1*	-13.2	1.2	1.2	-0.0	-4.3
Intrusiveness During Parent-Child Semistructured Play	1.6	1.6	0.0	0.6	1.6	1.7	-0.1*	-17.6
Detachment During Parent-Child Puzzle Challenge Task	1.6	1.7	-0.0	-4.6	1.6	1.6	0.0	2.7
Intrusiveness During Parent-Child Puzzle Challenge Task	2.6	2.7	-0.1	-6.4	2.8	2.8	-0.1	-4.4
Negative Regard During Parent-Child Semistructured Play	1.3	1.3	0.0	1.9	1.3	1.3	-0.0	-6.0
HOME Harshness	0.3	0.3	0.0	2.0	0.2	0.1	0.0	6.4
Percentage of Parents Who Spanked Child in the Past Week***	46.2	53.3	-7.1**	-14.2	47.8	56.4	-8.7**	-17.3
Knowledge of Safety Practices and Discipline Strategies								
Percentage of Parents Who Usually Use a Car Seat Correctly***	68.1	67.7	0.5	1.0	73.5	77.9	-4.4	-9.6
Percentage of Parents Suggesting Physical Punishment as a Discipline Strategy***	44.1	49.9	-5.9**	-11.7	51.9	52.8	-0.9	-1.8
Percentage of Parents Who Would Use Mild Discipline Only***	46.8	40.7	6.1**	12.4	39.4	40.1	-0.8	-1.5
Index of Severity of Discipline Strategies	3.3	3.5	-0.2**	-14.3	3.6	3.6	-0.0	-0.8
Parent Physical and Mental Health								
Parent's Health Status**	3.4	3.5	-0.1**	-12.1	3.6	3.5	0.1	14.0
Parenting Stress Index (PSI) Parental Distress	24.5	25.5	-1.0*	-10.9	25.2	25.3	-0.1	-0.9
PSI Parent-Child Dysfunctional Interaction	17.6	17.9	-0.2	-3.9	18.0	17.3	0.7	12.1
Center for Epidemiological Studies Depression (CES-D; Short Form)	7.4	7.8	-0.5	-6.4	7.4	7.0	0.4	6.1
CES-D Severe Depressive Symptoms ***	15.5	16.5	-1.0	-2.7	11.9	10.5	1.4	3.9
Family Environment Scale (FES): Family Conflict	1.7	1.7	-0.0	-2.1	1.6	1.6	-0.1	-10.8
Father Presence								
Currently Married to Biological Father ***	31.0	32.6	-1.6	-3.3	43.6	44.9	-1.2	-2.6
Biological Father is Currently Married to, Lives with, or is Boyfriend of Respondent***	48.0	48.9	-0.9	-1.8	51.5	55.4	-3.9	-7.8
Biological Father Currently Present in Child's Life***	73.3	69.9	3.4	7.6	71.9	73.4	-1.5	-3.4
Continuous Biological Father Involvement Child Age 14-36 Months***	68.1	67.6	0.5	1.0	65.3	67.6	-2.3	-5.0

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TABLE E.VI.13 (*continued*)

	Urban Sites				Rural or Non-Urban Sites			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
No Biological Father Involvement Child Age 14-36 Months***	12.0	12.1	-0.1	-0.2	12.8	11.8	1.0	3.3
Continuous Male Involvement Child Age 14-36 Months***	79.2	80.6	-1.4	-3.8	80.4	88.1	7.7**	-21.5
No Male Involvement Child Age 14-36 Months***	2.5	2.0	0.5	4.3	1.5	1.7	-0.2	-1.3
Sample Size								
Bayley	492	430	922		387	349	736	
Parent Interview	623	565	1,188		484	438	922	
Parent-Child Interactions	484	438	922		390	346	736	

SOURCE: Parent interviews, child assessments, interviewer observations, and assessments of structured parent-child interactions conducted when children were approximately 36 months old.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE E.VI.14

IMPACTS ON SELF-SUFFICIENCY AT 28 MONTHS, BY WHETHER PROGRAM IS LOCATED IN AN URBAN AREA

	Urban Sites				Rural or Non-Urban Sites			
Outcome	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c
Education/Job Training								
Ever in Education or Training***^{d}	60.9	51.0	9.9***	19.8	57.7	54.2	3.5	7.1
Ever in High School***	14.0	8.7	5.3***	18.4	12.7	9.8	2.9	10.2
Ever in ESL Class***	3.4	2.5	0.8	5.8	4.0	2.8	1.1	7.9
Ever in Vocational Program***	21.7	16.0	5.7**	15.0	15.7	21.4	-5.6	-14.9
Average Hours per Week in Education or Training	4.8	3.4	1.4***	22.1	4.2	3.6	0.6	8.8
In Education or Training:								
1st Quarter***	21.8	21.7	0.1	0.3	23.3	24.7	-1.3	-3.3
2nd Quarter***	27.1	24.6	2.5	5.9	27.0	28.1	-1.1	-2.5
3rd Quarter***	31.9	26.3	5.5**	12.5	30.3	29.5	0.8	1.8
4th Quarter***	31.7	24.8	6.9***	16.1	29.0	27.3	1.7	3.9
5th Quarter***	32.1	25.0	7.2***	16.6	26.4	28.7	-2.3	-5.3
6th Quarter***	31.7	22.6	9.1***	21.9	24.3	24.9	-0.6	-1.5
7th Quarter***	27.8	20.5	7.2***	18.0	22.2	24.0	-1.8	-4.4
8th Quarter***	28.3	19.8	8.5***	21.6	22.3	20.4	1.9	4.8
Have High School Diploma***	49.3	47.2	2.1	4.2	52.2	55.3	-3.1	-6.3
Have GED***	10.7	12.7	-2.1	-6.5	8.6	6.4	2.3	7.1
Employment								
Ever Employed***	87.7	83.6	4.1*	11.0	84.4	83.3	1.1	2.8
Average Hours/Week Employed	16.8	16.4	0.5	3.2	17.8	18.5	-0.7	-4.4
Employed in:								
1st Quarter***	35.8	38.0	-2.2	-4.5	46.5	39.1	7.4**	15.2
2nd Quarter***	43.1	45.0	-1.9	-3.9	51.8	44.9	6.9*	13.8
3rd Quarter***	51.7	51.7	0.0	0.0	55.7	53.0	2.7	5.3
4th Quarter***	56.1	54.7	1.4	2.8	58.1	55.6	2.5	5.0
5th Quarter***	59.5	59.4	0.1	0.2	65.6	60.8	4.8	9.7
6th Quarter***	62.8	58.5	4.3	8.7	66.5	61.9	4.6	9.3
7th Quarter***	59.4	55.3	4.1	8.3	61.7	61.8	-0.1	-0.2
8th Quarter***	63.7	60.4	3.2	6.6	62.3	62.0	0.3	0.7
Any Self-Sufficiency-Oriented Activity (Education, Training or Employment)								
Ever Employed or in Education/Training***	94.6	90.7	3.9**	12.8	92.4	90.2	2.3	7.4
Average Hours per Week in Any Activity	22.3	20.2	2.1**	13.5	22.3	22.2	0.2	1.0
In Activities in:								
1st Quarter***	51.0	50.5	0.5	1.0	59.3	55.5	3.7	7.5
2nd Quarter***	60.4	57.2	3.2	6.5	67.2	62.1	5.0	10.2
3rd Quarter***	69.7	64.7	5.0**	10.4	71.5	69.4	2.1	4.4
4th Quarter***	72.1	65.0	7.1***	14.9	72.6	69.3	3.3	6.9
5th Quarter***	74.0	68.7	5.2**	11.3	75.2	73.7	1.5	3.1
6th Quarter	76.6	66.8	9.8***	20.7	77.1	72.3	4.8	10.2
7th Quarter***	72.1	64.2	8.0***	16.6	70.5	69.9	0.6	1.2
8th Quarter***	75.6	67.9	7.7***	16.6	70.6	69.7	0.8	1.8

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TABLE E.VI.14 *(continued)*

	Urban Sites				Rural or Non-Urban Sites			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
AFDC/TANF Receipt								
Ever Received AFDC/TANF***	53.0	51.0	2.0	4.0	32.6	30.3	2.3	4.7
Received AFDC/TANF in:								
1st Quarter***	38.9	36.8	2.1	4.5	22.1	17.4	4.7*	10.0
2nd Quarter***	39.9	39.4	0.5	1.1	21.3	18.6	2.7	5.7
3rd Quarter***	42.9	40.2	2.7	5.6	21.8	21.6	0.2	0.5
4th Quarter***	36.7	35.8	0.9	1.9	15.3	15.9	-0.6	-1.2
5th Quarter***	34.9	35.1	-0.2	-0.5	17.2	14.9	2.3	5.1
6th Quarter***	34.4	35.6	-1.1	-2.5	15.7	16.7	-1.1	-2.4
7th Quarter***	26.8	30.6	-3.9	-8.8	12.8	13.6	-0.8	-1.9
8th Quarter***	25.8	26.6	-0.9	-2.1	13.2	13.3	-0.1	-0.2
Total AFDC/TANF Benefits ($)	$2,616	$2,738	-$123	-3.2	$1,015	$806	$208	5.4
Receipt of Other Welfare Benefits								
Ever Received Welfare***	71.2	69.9	1.3	2.8	60.8	58.3	2.5	5.3
Total Welfare Benefits ($)	$6,016	$6,253	-$236	-3.1	$3,582	$3,693	-$112	-1.5
Ever Received Food Stamps***	64.0	62.6	1.4	2.8	52.9	51.3	1.6	3.2
Total Food Stamp Benefits ($)	$2,223	$2,228	-$6	-0.2	$1,837	$1,636	$201	7.4
Income/Poverty								
Income Above Poverty Level***	43.4	40.7	2.7	5.4	41.8	50.1	-8.3*	-16.7
Subsequent Births								
Subsequent Birth by 24 Months after Random Assignment***	20.1	28.6	-8.4***	-18.8	29.9	23.0	6.9	15.4
Sample Size	**613**	**588**	**1,201**		**463**	**423**	**886**	

SOURCE: Parent Services Follow-Up Interviews completed an average of 17, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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TABLE E.VII.1

POSSIBLE SUBGROUP CONFOUNDING

NOTABLE DIFFERENCES ACROSS KEY SUBGROUPS		
African American Families	**Hispanic Families**	**White, Non-Hispanic Families**
• Less likely to be in home-based programs (37 vs. 50-53%) • More likely to be in programs that were implemented incompletely (43 vs 17-26%) • More likely to include teenage mothers (52 vs. 29-32%) • More likely to enroll with firstborn children (69 vs 54-60%) • More likely to be in school or training when enrolled (34 vs 15%) and less likely to be neither employed nor in school (44 vs 59-63%) • More likely to be receiving welfare cash assistance (50 vs 23-31%) • Less likely to live with a spouse (7 vs 33-37%) and more likely to live alone (48 vs 25-34%) • Less likely to be at risk of depression (39 vs. 51-57%) • More likely to have 3-5 demographic risk factors (70 vs 49-56%) and 4-5 risk factors (36 vs 20-24%)	• More likely to be in later implemented programs (56 vs 21-37%) • Primary language less likely to be English (26 vs 97-98%) • Much less likely to have completed 12th grade or GED (28 vs 52- 67%)	• More likely to be in early implemented programs (54 vs 20-27%) • More likely to live in states with a welfare work requirement for parents of infants (62 vs 26-32%) • More likely to live in nonurban areas (59 vs 30-32%)

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TABLE E.VII.1 *(continued)*

NOTABLE DIFFERENCES ACROSS KEY SUBGROUPS		
Families Who Enrolled Before Child Was Born	**Families Who Enrolled After Child Was Born**	
• More likely to be in mixed-approach programs (44 vs 25-35%) • More likely to live in an urban area (68 vs 56%) • More likely to be in high-risk group (4 to 5 factors)		
Families That Enrolled With Firstborn Child	**Families That Enrolled With Later-Born Child**	
• More likely to be African American (38 vs 28%) • More likely to include teenage mothers (55 vs 13%) • More likely to live with other adults (47 vs 25%) • More likely to be in school or training when enrolled (30 vs 8%) • More likely to have less than a high school diploma or GED when enrolled (52 vs 42%) • More likely to have 3-5 demographic risk factors (63 vs 49%)	• More likely to be neither employed nor in school or training when enrolled (68 vs 47%) • More likely to live with a spouse when enrolled (38 vs 18%)	

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TABLE E.VII.1 *(continued)*

NOTABLE DIFFERENCES ACROSS KEY SUBGROUPS		
Families of Teenage Mothers	**Families With Older Mothers**	
• More likely to be African American (46 vs 27%) • More likely to live with other adults (59 vs 27%) • More likely to enroll with firstborn child (88 vs 47%) • More likely to be in school or training when enrolled (44 vs 8%) • More likely to have completed less than a high school diploma or GED (73 vs 32%) • More likely to have 3-5 demographic risk factors (87 vs 39%) and 4-5 risk factors (52 vs 11%)	• More likely to be white (42 vs 31%) • More likely to be employed (28 vs 16%) or neither employed nor in school or training (64 vs 39%) when enrolled • More likely to live with spouse (34 vs 11%)	
Families Who Were Receiving Cash Assistance at Enrollment	**Families Who Were Not Receiving Cash Assistance at Enrollment**	
• More likely to live in an urban area (66 vs 51%) • More likely to be African American (47 vs 25%) and less likely to be Hispanic (17 vs 30%) • More likely to be neither employed nor in school or training when enrolled (65 vs 52%) • More likely to live alone with children when enrolled (57 vs 26%) • More likely to have 3-5 demographic risk factors (81 vs 42%) and 4-5 risk factors (45 vs 14%)	• More likely to live in a state with a welfare work requirement for parents of infants (48 vs 33%) • More likely to be Hispanic (30 vs 17%) • Much more likely to be employed when enrolled (31 vs 13%) • More likely to live with a spouse when enrolled (38 vs 10%) • More likely to be at risk of depression (56 vs 45%)	

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TABLE E.VII.1 *(continued)*

NOTABLE DIFFERENCES ACROSS KEY SUBGROUPS		
Families in Which Parent Was Initially Employed	**Families in Which Parent Was Initially in School or Job Training**	**Families in Which Parent Was Initially Neither Working Nor in School or Training**
• More likely to live in a state with work requirement for parents of infants (55 vs 36-39%) • Less likely to be receiving welfare cash assistance at enrollment (18 vs 40-41%) • More likely to enroll with an older infant (50 vs 36-37%) • More likely to have education beyond a high school diploma (34 vs 18-21%) • More likely to have 0-2 demographic risk factors (79 vs 26-33%) and 0-1 demographic risk factors (43 vs 8-11%)	• More likely to be in incompletely implemented programs • Less likely to be white (26 vs 40-41%) and more likely to be African American (54 vs 28-33%) • More likely to include teenage mothers (77 vs 27-28%) • More likely to have completed less than a high school diploma or GED (73 vs 29-46%) • More likely to enroll with firstborn child (86 vs 53-60%) • More likely to live with other adults (61 vs 31-35%) • Less likely to live with a spouse (8 vs 24-33%)	• More likely to be in home-based programs (50 vs 38-43%) • More likely to live with a spouse (33 vs 8-24%)

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TABLE E.VII.1 *(continued)*

NOTABLE DIFFERENCES ACROSS KEY SUBGROUPS		
Families in Which Parent Had Less than 12th Grade Education When Enrolled	**Families in Which Parent Had Completed 12th Grade or GED When Enrolled**	**Families in Which Parent Had Completed More Than 12th Grade When Enrolled**
• More likely to be in later-implemented programs (43 vs 25-27%) and less likely to be in early-implemented program (30 vs 40-42%) • Less likely to live in a state with no welfare work requirement for parents of infants (66 vs 49-53%) • More likely to include teenage parents (59 vs 11-29%) • More likely to enroll with firstborn child (67 vs 56-59%) • More likely to live with other adults (49 vs 25-33%) and less likely to live alone (30 vs 41%) • Less likely to be white (26 vs 46-49%) and more likely to be Hispanic (35 vs 12-13%) • Less likely to be employed when enrolled (14 vs 30-34%) and more likely to be in school or training (33 vs 7-17%) • More likely to have 3-5 demographic risk factors (84 vs 24-42%) and 4-5 risk factors (50 vs 1-8%)	• More likely to be neither in school nor employed when enrolled (63 vs 50-53%) • More likely to have 2-3 demographic risk factors (67 vs 48-56%)	• More likely to be at risk of depression (57 vs 48-49%) • More likely to have 0-2 demographic risk factors (76 vs 16-58%) or 0-1 risk factors (43 vs 2-25%)

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TABLE E.VII.1 *(continued)*

NOTABLE DIFFERENCES ACROSS KEY SUBGROUPS		
Families in Which Parent Lived With Spouse When Enrolled	**Families in Which Parent Lived With Other Adults When Enrolled**	**Families in Which Parent Lived Alone With Her Children When Enrolled**
• More likely to be in early-implemented programs (41 vs 30-35%) • More likely to live in a nonurban area (55 vs 35-39%) • More likely to be white (49 vs 32-35%) or Hispanic (34 vs 16-23%) • More likely to include older mothers (82 vs 41-67%) • More likely to be neither employed nor in school or training (71 vs 45-54%) • More likely to be at risk of depression (63 vs 47-49%) • More likely have 0-2 demographic risk factors (83 vs 24-33%) an 0-1 risk factors (47 vs 6-11%)	• More likely to be in mixed-approach programs (42 vs 26-31%) and less likely to be in home-based programs (36 vs 52-53%) • More likely to be in later-implemented programs (42 vs 28-33%) • More likely to include teenage mothers (58 vs 17-33%) • More likely to have completed less than a high school diploma or GED (60 vs 40%) and less likely to have completed more than 12th grade (15 vs 27-31%) • More likely to be in school or training when enrolled (35 vs 7-19%) • More likely to enroll with first child (76 vs 44-61%)	• More likely to be in incompletely-implemented programs (41 vs 23-26%) • More likely to be receiving welfare cash assistance when enrolled (54 vs 12-33%)

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TABLE E.VII.1 *(continued)*

NOTABLE DIFFERENCES ACROSS KEY SUBGROUPS		
Families with 3-5 Demographic Risk Factors	**Families with 0-2 Demographic Risk Factors**	
• More likely to be African American (42 vs 24%) • More likely to be teenage mother (58 vs 11%) • More likely to enroll with firstborn child (68 vs 54%) • More likely to in school or training (27 vs 13%) or neither in school or training (64 vs 43%) when enrolled • More likely to have completed less than 12th grade or GED when enrolled (69 vs 18%) • More likely to live with other adults (51 vs 22%) or alone (41 vs 28%) when enrolled • More likely to be receiving welfare cash assistance when enrolled (51 vs 15%)	• More likely to live in a state with a welfare work requirement for parents of infants (52 vs 36%) • More likely to be white (46 vs 32%) • More likely to be employed when enrolled (44 vs 9%) • More likely to live with a spouse when enrolled (50 vs 8%) • More likely to be at risk of depression when enrolled (58 vs 46%)	

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TABLE E.VII.1 *(continued)*

NOTABLE DIFFERENCES ACROSS KEY SUBGROUPS		
Families Not At Risk of Depression	**Families at Risk of Depression**	
• More likely to be in home-based programs (36 vs 25%) • More likely to be in incompletely implemented programs (36 vs 25%) • More likely to be African American (37 vs 23%) • More likely to live with spouse (32 vs 22%) • More likely to be receiving cash assistance at baseline (48 vs 37%) • More likely to be in early-implemented programs (67 vs 56%) • More likely to have 3-5 demographic risk factors (65 vs 52%)	• More likely to be in mixed-approach programs (61 vs 51%) • More likely to be in early-implemented programs (60 vs 48%) • More likely to be white (51 vs 40%) • More likely to live with a spouse (26 vs 16%)	

NOTE: Only differences greater than 10 percentage points are noted in the table.

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TABLE E.VII.2

IMPACTS ON SERVICE RECEIPT DURING THE FIRST 28 MONTHS, BY AFDC/TANF RECEIPT AT ENROLLMENT

	Received AFDC/TANF			Did Not Receive AFDC/TANF		
	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant
Any Services						
Any Key Services***[a,b]	96.0	79.8	16.2***	95.5	80.6	14.9***
Any Home Visits Or Center-Based Child Care***	91.7	57.9	33.8***	92.5	57.8	34.6***
More Than 1 Home Visit or 2 Weeks Center-Based Child Care***	90.1	52.7	37.4***	92.0	53.6	38.5***
Home Visits or Center Care at Required Intensity in at Least 1 Followup***	72.3	5.5	66.8***	76.7	15.5	61.1***
Home Visits or Center Care at Required Intensity in All 3 Followups***	24.0	0.9	23.1***	35.6	4.7	30.9***
Home Visits						
Any Home Visits***	86.6	33.7	52.9***	86.4	33.2	53.2***
Any Child Development Services During Home Visits***	84.7	32.1	52.6***	86.0	31.7	54.3***
Weekly Home Visits, 1st Follow-Up Period***	47.5	2.9	44.6***	45.4	2.4	43.0***
Weekly Home Visits, 2nd Follow-Up Period***	34.6	0.5	34.1***	36.9	3.5	33.5***
Weekly Home Visits, 3rd Follow-Up Period***	34.2	1.2	33.0***	29.2	2.4	26.8***
Weekly Home Visits in At Least 1 Followup***	65.7	3.8	61.8***	56.7	6.2	50.5***
Weekly Home Visits in All 3 Followups***	17.3	0.7	16.6***	22.2	0.9	21.3***
Child Care						
Any Child Care***	83.8	80.5	3.3	83.3	77.8	5.5**
Any Center-Based Child Care***	43.2	34.2	9.0*	50.1	36.2	13.9***
Average Hours Per Week of Center-Based Care	4.0	2.5	1.5*	6.1	3.5	2.7***
Concurrent Child Care Arrangements***	43.7	42.3	1.4	49.3	47.6	1.7
Average Weekly Out-of-Pocket Cost of Care	$3.47	$6.74	-$3.27**	$5.02	$8.42	-$3.40***
Received a Child Care Subsidy***	51.3	63.4	-12.2	21.3	23.0	-1.7
Child Was in Care at 12 Months of Age***	72.4	57.9	14.5**	65.9	56.2	9.7***
Child Was in Care at 24 Months of Age***	69.2	56.0	8.1	62.3	57.6	4.7
Case Management						
Any Case Management Meetings***	85.1	59.0	26.0***	87.0	51.9	35.1***
Weekly Case Management, 1st Follow-Up Period***	44.7	9.7	35.0***	44.6	7.2	37.4***
Weekly Case Management, 2nd Follow-Up Period***	35.8	3.0	32.9***	34.6	6.4	28.2***
Weekly Case Management, 3rd Follow-Up Period***	28.1	4.2	23.9***	30.0	3.9	26.2***
Group Activities						
Any Group Parenting Activities***	67.9	31.3	36.6***	71.6	37.1	34.6***
Any Parent-Child Group Activities**	40.7	7.8	32.9***	42.0	15.3	26.6***

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TABLE E.VII.2 (*continued*)

	Received AFDC/TANF			Did Not Receive AFDC/TANF		
	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant
Early Intervention Services						
Identification of Child's Disability***	7.5	4.8	2.7	7.7	5.7	2.0
Services for Child With Disability***	4.6	1.8	2.8	5.5	3.9	1.6
Child Health Services						
Any Child Health Services***	100.0	100.0	0.0	100.0	99.6	0.5
Any Doctor Visits***	99.1	97.6	1.5	98.4	98.0	0.5
Any Emergency Room Visits***	51.4	55.4	-4.0	51.5	51.2	0.3
Number of Emergency Room Visits for Injuries	0.3	0.2	0.0	0.2	0.3	-0.1*
Any Dentist Visits***	29.5	29.1	0.3	28.4	27.2	1.2
Any Screening Tests***	69.0	71.6	-2.6	65.0	62.5	2.5
Any Immunizations***	99.4	96.7	2.7**	98.0	97.9	0.1
Family Development Services						
Any Education-Related Services***	84.7	54.1	30.6***	85.0	56.5	28.6***
Any Employment-Related Services***	81.9	63.9	18.1***	72.6	40.3	32.3***
Any Family Health Services[c]	100.0	100.0	0.0	100.0	100.0	0.0
Any Family Mental Health Services***	28.1	23.2	4.9	21.4	22.2	-0.8
Transportation Assistance***	41.5	31.2	10.3**	26.8	20.6	6.2**
Housing Assistance***	73.2	74.9	-1.6	50.6	46.2	4.5
Sample Size	**285**	**265**	**550**	577	534	1,111

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroups are included in the estimates for each subgroup.

[a] Home visits, case management, center-based child care, and/or group parenting activities.

[b] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups in the first two columns.

[c] There is no variance across subgroups due to lack of variance in level of services.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

AFDC = Aid to Families with Dependent Children
TANF = Temporary Assistance for Needy Families

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TABLE E.VII.3

IMPACTS ON CHILD AND FAMILY OUTCOMES AT AGE 3, BY AFDC/TANF RECEIPT AT ENROLLMENT

	Received AFDC/TANF				Did Not Receive AFDC/TANF			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Child Cognitive and Language Development								
Bayley Mental Development Index (MDI) Standard Score	90.7	91.1	-0.4	-3.0	90.9	89.8	1.1	8.5
Percentage with MDI < 85***[d]	32.5	21.0	11.5	24.8	27.8	35.2	-7.4**	-15.8
Peabody Picture Vocabulary Test (PPVT)-III Standard Score	81.6	82.0	-0.4	-2.4	83.7	81.7	1.9	11.8
Percentage with PPVT-III < 85***	55.6	59.5	-4.0	-7.9	50.1	55.4	-5.3	-10.7
Child Social-Emotional Development								
Engagement of Parent During Parent-Child Semistructured Play	4.8	4.7	0.1	6.2	4.8	4.7	0.1	13.1
Sustained Attention with Objects During Parent-Child Semistructured Play	5.1	4.9	0.2	19.6	5.0	4.9	0.1	12.7
Engagement of Parent During Parent-Child Puzzle Challenge Task**	4.7	5.0	-0.3*	-28.9	5.1	5.0	0.1	7.4
Persistence During Parent-Child Puzzle Challenge Task	4.6	4.4	0.2	21.1	4.6	4.6	0.0	1.1
Bayley Behavioral Rating Scale (BRS): Emotional Regulation	3.9	3.9	-0.0	-0.7	4.0	4.0	-0.1	-6.9
Bayley BRS: Orientation/ Engagement	3.6	3.7	-0.1	-12.0	3.9	3.8	0.1*	12.2
Negativity Toward Parent During Parent-Child Semistructured Play	1.2	1.4	-0.1	-20.3	1.2	1.3	-0.1**	-17.2
Frustration During Parent-Child Puzzle Challenge Task	2.5	2.9	-0.3	-25.2	2.8	2.8	-0.0	-0.2
Child Behavior Checklist—Aggressive Behavior	10.9	12.1	-1.2	-18.2	10.6	11.1	-0.4	-6.6
Child Health Status								
Child's Health Status	4.1	4.0	0.1	10.3	4.0	4.0	-0.0	-0.3
Percentage of Children in Fair or Poor Health***	10.1	9.1	1.0	3.5	6.7	7.8	-1.0	-3.5
Quality of the Home Environment and Parenting: Overall and Physical Environment								
Home Observation for Measurement of the Environment (HOME) Total Score	26.9	26.6	0.3	5.3	27.5	27.2	0.3	5.4
HOME Internal Physical Environment	7.7	7.8	-0.1	-9.6	7.8	7.9	-0.1	-8.0
Parenting Behavior: Emotional Support								
HOME Warmth	2.5	2.5	0.0	2.5	2.5	2.5	-0.0	-0.3
Supportiveness During Parent-Child Semistructured Play	4.0	3.9	0.1	10.3	4.0	3.9	0.1	8.4
Supportive Presence During Parent-Child Puzzle Challenge Task	4.3	4.5	-0.2	-13.9	4.6	4.5	0.1	4.3
Parenting Behavior: Stimulation of Language and Learning								
Percentage of Children with a Regular Bedtime***	66.9	59.3	7.6	15.4	57.4	57.5	-0.1	-0.2
Percentage of Children Who Follow a Bedtime Routine***	73.9	63.7	10.2*	22.0	68.9	65.9	3.1	6.6

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TABLE E.VII.3 (*continued*)

	Received AFDC/TANF				Did Not Receive AFDC/TANF			
Outcome	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c
HOME: Support of Language and Learning	10.5	10.2	0.3	13.1	10.5	10.5	0.0	1.7
Parent-Child Play	4.4	4.3	0.1	6.9	4.4	4.4	0.0	0.0
Quality of Assistance During Parent-Child Puzzle Challenge Task	3.6	3.4	0.2	16.1	3.7	3.6	0.1	5.2
Percentage of Parents Who Read to Child Daily***	58.4	49.1	9.3	18.6	55.6	51.9	3.7	7.4
Percentage of Parents Who Read to Child at Bedtime***	40.0	26.3	7.7	16.9	32.0	28.8	3.3	7.2
Parenting Behavior: Negative Parenting Behavior								
Detachment During Parent-Child Semistructured Play	1.3	1.2	0.1	10.4	1.2	1.2	-0.0	-3.8
Intrusiveness During Parent-Child Semistructured Play	1.6	1.6	-0.1	-7.7	1.5	1.6	-0.1	-10.5
Detachment During Parent-Child Puzzle Challenge Task	1.8	1.6	0.2	22.7	1.6	1.5	0.1	9.0
Intrusiveness During Parent-Child Puzzle Challenge Task	2.7	2.9	-0.2	-19.2	2.6	2.6	-0.1	-5.7
Negative Regard During Parent-Child Semistructured Play	1.3	1.4	-0.0	-0.9	1.3	1.2	0.0	5.5
HOME Harshness	0.3	0.3	-0.0	-2.8	0.2	0.3	-0.0	-2.1
Percentage of Parents Who Spanked Child in the Past Week***	44.1	54.6	-10.5*	-21.0	47.4	52.0	-4.6	-9.3
Knowledge of Safety Practices and Discipline Strategies								
Percentage of Parents Who Usually Use a Car Seat Correctly***	71.0	64.1	6.9	15.0	70.2	71.0	-0.8	-1.8
Percentage of Parents Suggesting Physical Punishment as a Discipline Strategy***	47.9	55.7	-7.8	-15.5	45.5	50.2	-4.7	-9.3
Percentage of Parents Who Would Use Mild Discipline Only***	43.5	37.6	5.9	12.0	44.5	40.7	3.8	7.7
Index of Severity of Discipline Strategies	3.4	3.7	-0.3*	-17.9	3.3	3.5	-0.1	-8.2
Parent Physical and Mental Health								
Parent's Health Status	3.3	3.4	-0.0	-3.1	3.5	3.5	-0.0	-1.9
Parenting Stress Index (PSI) Parental Distress	25.6	27.0	-1.5	-15.2	24.6	25.3	-0.7	-7.3
PSI Parent-Child Dysfunctional Interaction	18.2	18.8	-0.7	-10.6	18.0	17.6	0.4	6.4
Center for Epidemiological Studies Depression (CES-D; Short Form)	8.6	9.0	-0.5	-6.9	6.6	7.1	-0.5	-6.7
CES-D Severe Depressive Symptoms ***	19.4	20.4	-1.0	-2.7	11.2	13.5	-2.2	-6.2
Family Environment Scale (FES): Family Conflict	1.7	1.8	-0.1	-15.9	1.7	1.7	0.0	2.0
Father Presence								
Currently Married To Biological Father ***	22.1	22.5	-0.4	-0.8	42.4	43.9	-1.4	-2.9
Biological Father is Currently Married to, Lives with, or is Boyfriend of Respondent***	37.3	38.8	-1.4	-2.9	55.5	57.5	-2.0	-4.0
Biological Father Currently Present in Child's Life***	62.7	61.9	0.9	1.9	79.2	76.1	3.1	6.9

TABLE E.VII.3 (*continued*)

	Received AFDC/TANF				Did Not Receive AFDC/TANF			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Continuous Biological Father Presence Child Age 14-36 Months***	54.7	63.3	-8.6	-18.8	74.3	74.2	0.1	0.2
No Biological Father Presence Child Age 14-36 Months***	16.7	15.5	1.2	3.8	8.7	8.7	-0.1	-0.3
Continuous Male Presence Child Age 14-36 Months***	77.5	71.6	5.8	16.3	83.8	87.2	-3.4	-9.5
No Male Presence Child Age 14-36 Months***	2.5	2.3	0.2	1.4	2.0	1.9	0.1	1.0
Sample Size								
Bayley	233	205	438		469	406	875	
Parent Interview	294	269	563		604	537	1,141	
Parent-Child Interactions	234	195	429		471	428	899	

SOURCE: Parent interviews, child assessments, interviewer observations, and assessments of semistructured parent-child interactions conducted when children were approximately 36 months old.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE E.VII.4

IMPACTS ON SELF-SUFFICIENCY AT 28 MONTHS, BY AFDC/TANF RECEIPT AT ENROLLMENT

Outcome	Received AFDC/TANF Program Group Participants	Received AFDC/TANF Control Group[a]	Received AFDC/TANF Impact Estimate per Participant[b]	Received AFDC/TANF Effect Size[c]	Did Not Receive AFDC/TANF Program Group Participants	Did Not Receive AFDC/TANF Control Group[a]	Did Not Receive AFDC/TANF Impact Estimate per Participant[b]	Did Not Receive AFDC/TANF Effect Size[c]
Education/Job Training								
Ever in Education or Training***[d]	59.1	47.2	11.9**	23.7	56.5	48.6	7.9**	15.8
Ever in High School***	7.9	3.3	4.6*	16.1	11.8	8.1	3.7**	12.8
Ever in ESL Class***	0.6	3.1	-2.5*	-17.2	4.7	3.0	1.7	11.8
Ever in Vocational Program***	20.1	16.7	3.4	9.1	15.6	15.8	-0.3	-0.7
Average Hours per Week in Education or Training	3.6	2.7	0.9	14.4	4.8	3.4	1.4***	21.3
In Education or Training:								
1st Quarter***	21.5	22.4	-0.9	-2.1	20.2	21.7	-1.6	-3.8
2nd Quarter***	24.4	24.1	0.3	0.7	24.6	26.0	-1.4	-3.2
3rd Quarter***	31.6	26.4	5.1	11.8	28.1	23.7	4.5*	10.1
4th Quarter***	28.3	24.2	4.1	9.5	28.8	22.2	6.7**	15.5
5th Quarter***	26.6	26.9	-0.3	-0.6	29.5	22.9	6.6**	15.3
6th Quarter***	23.4	21.5	1.9	4.7	30.5	22.0	8.5***	20.3
7th Quarter***	18.7	13.6	5.1	12.6	28.3	20.5	7.8***	19.4
8th Quarter***	20.1	12.5	7.6*	19.3	26.5	19.5	7.0**	17.8
Have High School Diploma***	38.1	40.8	-2.7	-5.4	54.5	52.6	1.9	3.7
Have GED***	17.8	14.4	3.4	10.8	8.0	7.8	0.1	0.5
Employment								
Ever Employed***	82.6	80.8	1.8	4.7	88.1	82.4	5.7**	15.2
Average Hours/Week Employed	13.3	15.8	-2.5	-16.9	19.3	18.4	0.9	6.4
Employed in:								
1st Quarter***	25.8	32.3	-6.5	-13.4	46.7	45.1	1.5	3.1
2nd Quarter***	33.5	39.4	-5.8	-11.7	52.9	50.4	2.5	5.0
3rd Quarter***	42.9	43.5	-0.6	-1.3	59.4	56.3	3.2	6.3
4th Quarter***	51.3	42.0	9.3*	18.6	61.7	59.9	1.8	3.6
5th Quarter***	52.5	53.2	-0.7	-1.5	65.5	62.0	3.4	7.0
6th Quarter***	54.3	56.9	-2.5	-5.2	66.3	62.3	4.0	8.2
7th Quarter***	50.7	53.6	-2.9	-5.7	62.2	59.3	2.9	5.8
8th Quarter**	57.8	59.7	-1.9	-4.0	64.3	61.9	2.4	5.0
Any Self-Sufficiency-Oriented Activity (Education, Training or Employment)								
Ever Employed or in Education/Training***	91.4	88.9	2.5	8.3	93.9	89.8	4.1**	13.6
Average Hours per Week in Any Activity*	17.3	18.8	-1.5	-9.7	24.5	22.0	2.5**	15.9
In Activities in:								
1st Quarter***	44.1	43.8	0.3	0.6	57.5	56.7	0.8	1.5
2nd Quarter***	53.6	50.7	3.2	6.5	65.9	62.5	3.4	6.9
3rd Quarter***	63.1	60.0	3.2	6.7	73.0	67.1	5.9**	12.4
4th Quarter***	65.8	56.9	8.9*	18.7	74.9	67.4	7.5***	15.7
5th Quarter***	64.6	67.7	-3.1	-6.6	76.0	69.0	7.0**	15.1
6th Quarter***	68.4	67.9	0.5	1.1	77.6	69.9	7.7***	16.3
7th Quarter***	60.9	61.1	-0.2	-0.4	74.5	67.0	7.5**	15.6
8th Quarter***	68.6	63.5	5.1	10.9	74.9	69.6	5.3*	11.3

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TABLE E.VII.4 *(continued)*

	Received AFDC/TANF				Did Not Receive AFDC/TANF			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
AFDC/TANF Receipt								
Ever Received AFDC/TANF***	85.8	83.6	2.2	4.5	29.2	27.3	1.9	3.8
Received AFDC/TANF in:								
1st Quarter***	78.6	71.9	6.7	14.3	16.0	14.6	1.4	3.0
2nd Quarter***	76.3	72.5	3.8	8.1	17.5	15.5	2.0	4.2
3rd Quarter**	75.3	71.2	4.1	8.6	19.9	20.2	-0.3	-0.7
4th Quarter***	61.5	61.1	0.4	0.8	17.9	17.5	0.4	1.0
5th Quarter**	58.8	59.3	-0.5	-1.2	17.3	18.0	-0.7	-1.5
6th Quarter***	57.8	57.4	0.3	0.7	18.4	19.2	-0.8	-1.7
7th Quarter***	52.5	50.3	2.2	4.9	13.1	14.8	-1.7	-3.8
8th Quarter***	50.7	41.9	8.8	20.7	12.4	13.4	-1.0	-2.4
Total AFDC/TANF Benefits ($)*	$6,177	$6,207	-$30	-0.8	$1,041	$1,141	-$100	-2.6
Receipt of Other Welfare Benefits								
Ever Received Welfare***	94.7	94.0	0.7	1.6	58.5	54.4	4.2	8.9
Total Welfare Benefits ($)*	$12,690	$12,823	-$133	-1.8	$3,405	$3,779	-$374	-4.9
Ever Received Food Stamps***	89.1	89.9	-0.8	-1.6	50.7	46.1	4.6	9.5
Total Food Stamp Benefits ($)	$4,334	$4,042	$292	10.7	$1,474	$1,408	$66	2.4
Income/Poverty								
Income Above Poverty Level***	26.9	32.3	-5.4	-11.0	48.5	47.2	1.4	2.8
Subsequent Births								
Subsequent Birth by 24 Months after Random Assignment***	20.7	33.8	-13.1**	-29.1	20.9	22.2	-1.3	-2.8
Sample Size	**285**	**265**	**550**		**577**	**534**	**1,111**	

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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TABLE E.VII.5

IMPACTS ON SERVICE RECEIPT DURING THE FIRST 28 MONTHS, BY FOCUS CHILD'S GENDER

	Female			Male		
	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant
Any Services						
Any Key Services***a,b	95.4	80.1	15.3***	96.3	83.0	13.3***
Any Home Visits Or Center-Based Child Care***	92.1	56.1	36.0***	93.8	59.9	33.9***
More Than 1 Home Visit or 2 Weeks Center-Based Child Care***	91.2	50.2	40.9***	92.7	53.5	39.1***
Home Visits or Center Care at Required Intensity in at Least 1 Followup***	74.5	13.1	61.4***	74.0	14.5	59.5***
Home Visits or Center Care at Required Intensity in All 3 Followups***	30.9	3.7	27.2***	29.8	3.0	26.8***
Home Visits						
Any Home Visits***	85.8	33.6	52.2***	88.5	34.2	54.3***
Any Child Development Services During Home Visits***	84.0	31.1	52.8***	88.3	32.1	56.3***
Weekly Home Visits, 1st Follow-Up Period***	43.3	2.9	40.4***	47.5	3.5	44.1***
Weekly Home Visits, 2nd Follow-Up Period***	35.0	2.1	33.0***	35.2	2.7	32.5***
Weekly Home Visits, 3rd Follow-Up Period***	27.5	2.3	25.2***	30.3	2.4	27.9***
Weekly Home Visits in At Least 1 Followup***	55.4	5.4	50.0***	58.1	5.1	53.0***
Weekly Home Visits in All 3 Followups***	17.0	0.3	16.7***	20.1	0.7	19.4***
Child Care						
Any Child Care***	85.6	80.7	4.9**	87.3	78.9	8.4***
Any Center-Based Child Care***	50.7	35.4	15.3***	50.3	35.6	14.7***
Average Hours Per Week of Center-Based Care	6.6	3.1	3.5***	5.8	3.3	2.5***
Concurrent Child Care Arrangements***	52.5	47.3	5.2	51.1	41.8	9.3***
Average Weekly Out-of-Pocket Cost of Care	$4.44	$7.05	-$2.62***	$4.51	$7.03	-$2.52**
Received a Child Care Subsidy***	30.6	32.6	-2.0	29.7	32.3	-2.6
Child Was in Care at 12 Months of Age***	67.1	59.1	8.1**	66.4	51.1	15.3***
Child Was in Care at 24 Months of Age***	64.3	57.8	6.5*	61.9	50.3	11.7***
Case Management						
Any Case Management Meetings***	86.4	55.3	31.1***	87.6	55.1	32.5***
Weekly Case Management, 1st Follow-Up Period***	45.3	7.5	37.8***	47.1	10.1	37.0***
Weekly Case Management, 2nd Follow-Up Period***	33.0	4.9	28.1***	35.2	5.5	29.7***
Weekly Case Management, 3rd Follow-Up Period***	25.9	4.5	21.4***	31.4	4.7	26.7***
Group Activities						
Any Group Parenting Activities	68.7	36.4	32.4***	73.4	38.3	35.1***
Any Parent-Child Group Activities**	40.4	13.7	26.7***	42.8	14.9	27.9***

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TABLE E.VII.5 *(continued)*

	Female			Male		
	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant
Early Intervention Services						
Identification of Child's Disability***	5.6	3.9	1.7	8.8	7.0	1.8
Services for Child With Disability***	3.7	2.3	1.4	5.6	4.9	0.7
Child Health Services						
Any Child Health Services***	100.0	99.8	0.2	100.0	99.7	0.3
Any Doctor Visits***	99.4	98.0	1.4**	98.5	99.0	-0.4
Any Emergency Room Visits***	48.1	50.8	-2.7	60.2	56.0	4.2
Number of Emergency Room Visits for Injuries	0.2	0.3	-0.1*	0.3	0.3	0.0
Any Dentist Visits***	32.0	24.0	8.0***	24.5	29.0	-4.5
Any Screening Tests***	66.9	66.8	0.1	66.9	66.6	0.3
Any Immunizations***	99.4	97.5	1.8**	98.2	98.0	0.1
Family Development Services						
Any Education-Related Services***	87.3	60.3	27.0***	87.8	56.5	31.2***
Any Employment-Related Services***	76.8	47.6	29.1***	76.7	44.7	32.0***
Any Family Health Services[c]	100.0	100.0	0.0	100.0	100.0	0.0
Any Family Mental Health Services***	21.9	18.6	3.3	23.3	24.7	-1.5
Transportation Assistance***	31.0	22.3	8.6***	35.3	23.3	12.0***
Housing Assistance***	57.6	57.0	0.6	58.7	56.9	1.9
Sample Size	**530**	**503**	**1,033**	**545**	**508**	**1,053**

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroups are included in the estimates for each subgroup.

[a] Home visits, case management, center-based child care, and/or group parenting activities.

[b] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups in the first two columns.

[c] There is no variance across subgroups due to lack of variance in level of services.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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TABLE E.VII.6

IMPACTS ON CHILD AND FAMILY OUTCOMES AT AGE 3, BY FOCUS CHILD'S GENDER

	Female				Male			
Outcome	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c
Child Cognitive and Language Development								
Bayley Mental Development Index (MDI) Standard Score	92.2	90.9	1.4	10.6	90.8	89.0	1.8**	13.9
Percentage with MDI < 85***^{d}	26.9	29.2	-2.3	-4.9	27.6	34.0	-6.4*	-13.8
Peabody Picture Vocabulary Test (PPVT)-III Standard Score	86.0	83.7	2.3*	14.2	82.2	80.7	1.5	8.9
Percentage with PPVT-III < 85***	42.9	47.9	-5.0	-9.9	55.7	60.3	-4.6	-9.3
Child Social-Emotional Development								
Engagement of Parent During Parent-Child Semistructured Play	4.9	4.7	0.2**	19.4	4.8	4.6	0.2**	17.9
Sustained Attention with Objects During Parent-Child Semistructured Play	5.1	4.9	0.2**	15.6	4.9	4.8	0.2**	16.0
Engagement of Parent During Parent-Child Puzzle Challenge Task	5.0	4.9	0.1*	14.7	5.0	5.0	0.0	1.5
Persistence During Parent-Child Puzzle Challenge Task	4.8	4.6	0.1	10.6	4.4	4.3	0.1	5.7
Bayley Behavioral Rating Scale (BRS): Emotional Regulation	4.1	4.1	-0.0	-0.5	3.9	3.9	0.0	0.1
Bayley BRS: Orientation/ Engagement	3.9	3.9	0.1	6.5	3.8	3.8	0.0	0.9
Negativity Toward Parent During Parent-Child Semistructured Play**	1.3	1.3	0.0	0.6	1.2	1.4	-0.2***	-25.0
Frustration During Parent-Child Puzzle Challenge Task	2.7	2.7	0.0	0.1	2.7	2.7	0.0	1.8
Child Behavior Checklist—Aggressive Behavior	10.2	10.7	-0.5	-8.3	11.1	11.8	-0.7	-10.5
Child Health Status								
Child's Health Status*	4.0	4.1	-0.1	-11.3	4.0	4.0	0.1	6.9
Percentage of Children in Fair or Poor Health*	7.9	8.2	-0.3	-1.1	8.3	8.7	-0.4	-1.3
Quality of the Home Environment and Parenting: Overall and Physical Environment								
Home Observation for Measurement of the Environment (HOME) Total Score	28.0	27.2	0.8**	15.7	27.2	27.0	0.2	4.2
HOME Internal Physical Environment	7.9	7.9	0.1	4.9	7.8	7.8	-0.1	-4.5
Parenting Behavior: Emotional Support								
HOME Warmth	2.6	2.5	0.1	10.1	2.6	2.5	0.1	7.1
Supportiveness During Parent-Child Semistructured Play	4.1	3.9	0.2**	19.0	3.9	3.9	0.1	8.6
Supportive Presence During Parent-Child Puzzle Challenge Task	4.4	4.4	0.0	2.7	4.5	4.4	0.0	2.8
Parenting Behavior: Stimulation of Language and Learning								
Percentage of Children with a Regular Bedtime***	58.4	59.6	-1.2	-2.5	60.0	56.7	3.3	6.7
HOME: Support of Language and Learning	10.8	10.5	0.3**	15.3	10.5	10.4	0.1	3.4
Parent-Child Play	4.5	4.4	0.1*	13.5	4.4	4.3	0.0	3.8
Quality of Assistance During Parent-Child Puzzle Challenge Task	3.6	3.5	0.1	7.7	3.6	3.5	0.1	8.6
Percentage of Children Who Follow a Bedtime Routine***	70.7	69.0	1.6	3.5	67.5	68.3	-0.8	-1.6
Percentage of Parents Who Read to Child Daily***	59.2	54.8	4.5	8.9	55.3	49.3	6.0*	12.0

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TABLE E.VII.6 *(continued)*

	Female				Male			
Outcome	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c
Percentage of Parents Who Read to Child at Bedtime***	34.8	30.9	3.9	8.7	30.0	27.3	2.7	6.0
Parenting Behavior: Negative Parenting Behavior								
Detachment During Parent-Child Semistructured Play	1.2	1.3	-0.1	-8.7	1.2	1.3	-0.1	-8.0
Intrusiveness During Parent-Child Semistructured Play	1.6	1.6	0.0	2.8	1.6	1.7	-0.1	-11.2
Detachment During Parent-Child Puzzle Challenge Task	1.6	1.6	0.1	6.6	1.7	1.7	-0.0	-3.6
Intrusiveness During Parent-Child Puzzle Challenge Task	2.6	2.7	-0.1	-5.6	2.7	2.8	-0.1	-8.1
Negative Regard During Parent-Child Semistructured Play	1.3	1.3	0.0	6.9	1.3	1.3	-0.1	-8.2
HOME Harshness	0.2	0.2	-0.0	-2.3	0.3	0.3	0.0	6.3
Percentage of Parents Who Spanked Child in the Past Week***	43.4	52.1	-8.8**	-17.5	49.5	54.8	-5.4	-10.7
Knowledge of Safety Practices and Discipline Strategies								
Percentage of Parents Who Usually Use a Car Seat Correctly***	71.2	70.4	0.8	1.7	69.0	71.6	-2.6	-5.6
Percentage of Parents Suggesting Physical Punishment as a Discipline Strategy***	46.1	52.4	-6.3**	-12.6	46.1	49.4	-3.3	-6.6
Percentage of Parents Who Would Use Mild Discipline Only***	44.9	38.6	6.3*	12.8	44.4	42.3	2.1	4.3
Index of Severity of Discipline Strategies	3.3	3.6	-0.3**	-15.3	3.4	3.5	-0.1	-6.4
Parent Physical and Mental Health								
Parent's Health Status*	3.4	3.5	-0.1*	-13.7	3.5	3.5	0.0	3.4
Parenting Stress Index (PSI) Parental Distress	24.5	24.9	-0.4	-4.1	24.8	25.8	-0.9	-9.8
PSI Parent-Child Dysfunctional Interaction	17.4	17.2	0.2	2.6	18.1	18.2	-0.1	-0.9
Center for Epidemiological Studies Depression (CES-D; Short Form)	7.3	7.6	-0.3	-3.6	7.4	7.6	-0.2	-2.2
CES-D Severe Depressive Symptoms ***	14.8	15.0	0.2	-0.5	14.3	14.2	0.2	0.4
Family Environment Scale (FES): Family Conflict	1.6	1.7	-0.1	-9.2	1.7	1.7	0.0	1.5
Father Presence								
Currently Married To Biological Father ***	36.6	37.2	-0.6	-1.2	33.1	35.2	-2.0	-4.2
Biological Father is Currently Married to, Lives with, or is Boyfriend of Respondent***	48.4	51.9	-3.5	-7.1	49.4	49.5	-0.2	-0.4
Biological Father Currently Present in Child's Life***	73.3	69.9	3.3	7.5	72.5	71.3	1.2	2.7
Continuous Biological Father Presence Child Age 14-36 Months***	68.0	66.0	2.0	4.4	66.7	69.4	-2.7	-5.9
No Biological Father Presence Child Age 14-36 Months***	12.2	14.8	-2.6	-8.4	12.6	10.0	2.6	8.2
Continuous Male Presence Child Age 14-36 Months***	80.7	82.4	-1.8	-4.9	78.4	82.8	-4.3	-12.1
No Male Presence Child Age 14-36 Months***	2.8	1.9	0.9	7.7	2.0	1.8	0.2	2.0

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TABLE E.VII.6 (*continued*)

	Female				Male			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Sample Size								
Bayley	444	399	843		435	380	815	
Parent Interview	542	500	1,042		565	502	1,067	
Parent-Child Interactions	431	394	825		443	390	833	

SOURCE: Parent interviews, child assessments, interviewer observations, and assessments of semistructured parent-child interactions conducted when children were approximately 36 months old.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE E.VII.7

IMPACTS ON SELF-SUFFICIENCY AT 28 MONTHS, BY FOCUS CHILD'S GENDER

	Female				Male			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Education/Job Training								
Ever in Education or Training***[d]	61.2	53.0	8.2**	16.3	59.4	50.0	9.4***	18.7
Ever in High School***	12.1	8.5	3.6*	12.6	15.0	10.1	4.9***	17.2
Ever in ESL Class***	4.2	2.6	1.5	10.7	3.2	2.3	0.9	6.2
Ever in Vocational Program***	19.2	16.6	2.6	6.9	20.5	16.7	3.9	10.3
Average Hours per Week in Education or Training	4.3	3.4	0.9**	14.7	5.0	3.4	1.6***	25.5
In Education or Training:								
1st Quarter***	24.4	23.1	1.3	3.1	20.9	21.7	-0.8	-1.9
2nd Quarter***	29.3	25.5	3.8	8.9	26.1	24.7	1.3	3.1
3rd Quarter***	33.3	28.1	5.2*	11.8	30.8	25.0	5.8**	13.2
4th Quarter***	30.4	27.4	3.0	7.0	31.9	22.1	9.8***	22.9
5th Quarter***	29.6	28.4	1.1	2.7	32.3	21.7	10.6***	24.7
6th Quarter***	27.6	24.5	3.1	7.4	32.3	21.1	11.1***	26.8
7th Quarter***	25.4	21.9	3.5	8.6	27.5	21.1	6.4**	15.9
8th Quarter***	24.7	19.8	4.9	12.4	28.5	20.3	8.3***	21.0
Have High School Diploma***	52.7	48.8	3.9	7.8	48.0	49.4	-1.4	-2.8
Have GED***	10.0	11.5	-1.6	-4.9	10.3	10.5	-0.1	-0.4
Employment								
Ever Employed***	87.5	82.3	5.2**	13.9	88.3	84.1	2.2	5.8
Average Hours/Week Employed	18.4	16.9	1.5	10.5	16.2	16.9	-0.8	-5.2
Employed in:								
1st Quarter***	39.3	36.5	2.8	5.7	39.4	40.3	-0.9	-1.9
2nd Quarter***	48.4	44.1	4.3	8.7	43.8	45.9	-2.1	-4.2
3rd Quarter***	56.7	51.7	5.2	10.4	50.0	51.3	-1.3	-2.6
4th Quarter***	58.2	55.1	3.1	6.3	56.0	54.3	1.7	3.4
5th Quarter***	65.1	58.1	7.0**	14.3	58.7	60.8	-2.1	-4.3
6th Quarter***	68.5	59.7	8.7**	17.7	59.9	58.0	1.9	3.8
7th Quarter***	63.7	57.6	6.1*	12.2	57.0	56.1	0.9	1.8
8th Quarter***	66.1	62.6	3.5	7.2	60.8	58.9	1.8	3.8
Any Self-Sufficiency-Oriented Activity (Education, Training, or Employment)								
Ever Employed or in Education/Training***	94.3	89.7	4.6**	15.2	93.5	91.1	2.4	8.0
Average Hours per Week in Any Activity	23.2	20.4	2.8**	17.6	21.8	20.7	1.1	7.2
In Activities in:								
1st Quarter***	54.5	50.4	4.2	8.3	53.6	53.4	0.2	0.5
2nd Quarter***	65.9	57.4	8.5***	17.2	60.4	58.9	1.5	3.0
3rd Quarter***	74.7	65.8	8.9***	18.8	67.4	64.6	2.8	5.9
4th Quarter***	74.3	67.5	6.8**	14.2	71.2	63.7	7.5***	15.6
5th Quarter***	77.8	69.9	7.9***	17.1	72.2	69.5	2.7	5.8
6th Quarter***	80.0	69.7	10.3***	21.9	74.3	66.0	8.3***	17.7
7th Quarter***	75.6	66.1	9.4***	19.7	68.3	64.6	3.7	7.8
8th Quarter***	75.9	69.6	6.3*	13.6	72.4	67.5	4.9	10.4

TABLE E.VII.7 (*continued*)

	Female				Male			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
			AFDC/TANF Receipt					
Ever Received AFDC/TANF***	46.2	44.8	1.3	2.7	47.7	44.9	2.8	5.7
Received AFDC/TANF in:								
1st Quarter***	33.1	30.1	3.1	6.6	34.5	31.4	3.2	6.8
2nd Quarter***	34.7	33.2	1.5	3.2	34.3	33.0	1.3	2.8
3rd Quarter***	35.1	34.4	0.7	1.5	37.9	34.6	3.3	6.9
4th Quarter***	27.7	31.1	-3.4	-7.4	32.7	28.9	3.8	8.2
5th Quarter***	27.9	30.2	-2.4	-5.2	31.4	28.2	3.1	6.8
6th Quarter***	24.8	30.5	-5.7***	-12.3	32.6	28.9	3.7	8.0
7th Quarter***	18.9	26.0	-7.1**	-16.2	25.9	25.0	0.9	2.0
8th Quarter***	19.2	23.2	-4.0	-9.4	24.6	22.3	2.3	5.4
Total AFDC/TANF Benefits ($)*	$1,894	$2,121	-$237	-6.1	$2,378	$2,170	$209	5.4
			Receipt of Other Welfare Benefits					
Ever Received Welfare***	66.4	68.0	-1.6	-3.5	69.2	65.4	3.9*	8.2
Total Welfare Benefits ($)*	$4,893	$5,243	-$350	-4.6	$5,694	$5,720	$26	-0.3
Ever Received Food Stamps***	59.7	59.7	0.0	0.1	61.0	59.3	1.8	3.6
Total Food Stamp Benefits ($)	$2,069	$1,966	$104	3.8	$2,130	$2,214	-$84	-3.1
			Income/Poverty					
Income Above Poverty Level***	47.0	45.9	1.1	2.2	39.5	41.1	-1.6	-3.3
			Subsequent Births					
Subsequent Birth by 24 Months after Random Assignment***	23.7	28.4	-4.7	-10.5	22.8	28.0	-5.3	-11.7
Sample Size	**530**	**503**	**1,033**		**545**	**508**	**1,053**	

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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TABLE E.VII.8

IMPACTS ON SERVICE RECEIPT DURING THE FIRST 28 MONTHS, BY LABOR FORCE STATUS AT ENROLLMENT

	Employed			In School or Training			Neither Employed nor in School/Training		
	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant
Any Services									
Any Key Services***[a,b]	99.2	87.0	12.2***	94.1	78.4	15.7***	96.8	80.1	16.7***
Any Home Visits Or Center-Based Child Care***	99.3	63.8	35.5***	89.7	56.2	33.5***	91.6	53.2	38.4***
More Than 1 Home Visit or 2 Weeks Center-Based Child Care***	97.4	59.1	38.3***	89.9	44.3	45.7***	90.9	46.7	44.2***
Home Visits or Center Care at Required Intensity in at Least 1 Followup***	77.7	13.9	63.8***	71.2	12.9	58.3***	78.7	12.6	66.1***
Home Visits or Center Care at Required Intensity in All 3 Followups***	37.0	9.6	27.4***	20.3	2.5	17.8***	35.0	1.8	33.2***
Home Visits									
Any Home Visits***	94.1	37.1	57.0***	80.2	33.2	47.0***	86.3	33.3	53.0***
Any Child Development Services During Home Visits***	93.3	34.1	59.2***	79.7	31.8	47.9***	85.1	29.7	55.4***
Weekly Home Visits, 1st Follow-Up Period***	45.4	4.9	40.6***	43.9	2.4	41.5***	47.9	3.3	44.5***
Weekly Home Visits, 2nd Follow-Up Period***	35.5	1.8	33.7***	27.7	1.2	26.5***	39.9	3.0	36.9***
Weekly Home Visits, 3rd Follow-Up Period***	32.1	2.5	29.6***	22.9	4.1	18.8***	32.3	2.7	29.6***
Weekly Home Visits in At Least 1 Followup***	60.9	3.8	57.0***	54.3	4.6	49.7***	59.9	5.2	54.7***
Weekly Home Visits in All 3 Followups***	25.5	0.9	24.7***	13.3	0.7	12.6***	22.0	1.3	20.7***
Child Care									
Any Child Care***	95.4	93.0	2.3	93.7	89.3	4.4	79.7	71.5	8.2***
Any Center-Based Child Care***	50.3	39.1	11.2**	56.0	31.2	24.8***	47.0	30.3	16.7***
Average Hours Per Week of Center-Based Care	8.5	5.6	2.9*	5.8	2.4	3.4***	6.0	2.3	3.8***
Concurrent Child Care Arrangements***	60.8	61.9	-1.1	61.8	55.7	6.1	43.3	37.4	5.9*
Average Weekly Out-of-Pocket Cost of Care***	$4.84	$12.45	-$7.61***	$4.61	$3.75	$0.86	$3.74	$6.48	-$2.73***
Received a Child Care Subsidy***	24.7	41.2	-16.5*	47.8	38.9	8.9	27.8	30.0	-2.2
Child Was in Care at 12 Months of Age***	82.3	81.8	0.5	82.4	73.8	8.6	50.4	42.1	8.3**
Child Was in Care at 24 Months of Age***	74.7	74.2	0.5	72.4	67.5	4.9	51.3	41.2	10.1**
Case Management									
Any Case Management Meetings***	92.0	60.0	32.0***	83.1	57.8	25.4***	87.5	56.4	31.1***
Weekly Case Management, 1st Follow-Up Period***	57.0	13.9	43.1***	50.7	5.7	45.0***	48.9	9.0	39.8***
Weekly Case Management, 2nd Follow-Up Period***	41.6	4.2	37.5***	25.9	2.0	23.9***	38.0	6.8	31.2***
Weekly Case Management, 3rd Follow-Up Period***	36.6	3.2	33.4***	19.6	4.2	15.5***	29.6	5.7	23.9***

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TABLE E.VII.8 (*continued*)

	Employed			In School or Training			Neither Employed nor in School/Training		
	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant
Group Activities									
Any Group Parenting Activities***	71.1	35.4	35.6***	64.7	43.4	21.3***	73.4	35.1	38.3***
Any Parent-Child Group Activities***	43.2	17.8	25.4***	36.5	15.5	21.0***	44.2	14.8	29.3***
Early Intervention Services									
Identification of Child's Disability***	11.8	9.0	2.7	2.8	4.9	-2.1	9.0	6.2	2.8*
Services for Child With Disability***	9.9	7.1	2.8	1.4	2.1	-0.7	5.6	3.6	1.9
Child Health Services									
Any Child Health Services***	100.0	100.0	0.0	99.9	99.8	0.1	100.0	99.9	0.1
Any Doctor Visits***	98.4	98.5	-0.1	99.6	98.4	1.2	99.1	98.6	0.6
Any Emergency Room Visits***	48.0	53.0	-5.0	60.6	57.0	3.6	55.9	53.4	2.5
Number of Emergency Room Visits for Injuries	0.2	0.4	-0.2*	0.3	0.4	-0.1	0.2	0.2	0.0
Any Dentist Visits***	28.7	26.8	1.8	23.9	28.6	-4.7	30.0	26.7	3.3
Any Screening Tests***	63.8	68.1	-4.2	66.1	71.1	-5.1	68.3	65.3	3.0
Any Immunizations***	99.4	97.8	1.6	98.4	97.9	0.5	99.0	97.7	1.3
Family Development Services									
Any Education-Related Services***	86.5	48.5	38.0***	93.1	84.3	8.8**	84.7	52.0	32.7***
Any Employment-Related Services***	74.8	37.8	36.9***	76.1	55.6	20.5***	79.4	47.3	32.1***
Any Family Health Services[c]	100.0	100.0	0.0	100.0	100.0	0.0	100.0	100.0	0.0
Any Family Mental Health Services***	23.7	23.5	0.2	18.0	16.6	1.4	25.2	23.0	2.2
Transportation Assistance***	25.9	16.4	9.6**	29.0	35.0	-6.1	35.2	21.2	14.0***
Housing Assistance***	51.3	47.7	3.6	58.2	63.7	-5.5	63.3	56.8	6.4**
Sample Size	**253**	**226**	**479**	**231**	**205**	**436**	**557**	**544**	**1,101**

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroups are included in the estimates for each subgroup.

[a] Home visits, case management, center-based child care, and/or group parenting activities.

[b] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups in the first two columns. The third column is a subset of the second column and is included to aid interpretation of subgroup differences.

[c] There is no variance across subgroups due to lack of variance in level of services.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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TABLE E.VII.9

IMPACTS ON CHILD AND FAMILY OUTCOMES AT AGE 3, BY LABOR FORCE STATUS AT ENROLLMENT

	Employed				In School or Training				Neither Employed nor in School/Training			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Child Cognitive and Language Development												
Bayley Mental Development Index (MDI) Standard Score	93.5	91.6	1.9	14.4	90.7	89.6	1.1	8.3	92.0	90.0	2.0**	15.8
Percentage with MDI < 85***[d]	21.6	27.5	-5.9	-12.7	24.2	35.9	-11.7	-25.1	26.3	32.1	-5.8	-12.5
Peabody Picture Vocabulary Test (PPVT)-III Standard Score	86.6	83.1	3.5	21.3	82.3	78.8	3.4	21.0	82.7	81.6	1.2	7.2
Percentage with PPVT-III < 85***	44.7	48.3	-3.6	-7.2	54.4	64.6	-10.2	-20.5	49.5	57.8	-8.3*	-16.6
Child Social-Emotional Development												
Engagement of Parent During Parent-Child Semistructured Play*	4.8	4.6	0.3*	25.3	4.9	4.4	0.5**	44.2	4.7	4.7	0.0	3.1
Sustained Attention with Objects During Parent-Child Semistructured Play**	5.1	4.7	0.4***	38.8	5.1	4.6	0.5***	50.0	4.9	4.9	-0.0	-1.3
Engagement of Parent During Parent-Child Puzzle Challenge Task	5.0	5.0	0.0	1.1	5.1	4.7	0.4*	37.5	5.0	5.0	0.0	1.6
Persistence During Parent-Child Puzzle Challenge Task	4.6	4.5	0.1	8.4	4.7	4.2	0.5**	44.1	4.5	4.5	-0.0	-2.0
Bayley Behavioral Rating Scale (BRS): Emotional Regulation	4.1	4.0	0.1	8.3	4.1	4.1	0.1	11.1	4.0	4.0	-0.0	-2.6
Bayley BRS: Orientation/ Engagement	3.8	3.8	-0.1	-7.1	4.0	3.8	0.1	15.9	3.9	3.8	0.1	7.8
Negativity Toward Parent During Parent-Child Semistructured Play	1.2	1.3	-0.1*	-23.6	1.2	1.3	-0.1	-17.0	1.3	1.3	-0.1	-8.3
Frustration During Parent-Child Puzzle Challenge Task**	2.7	2.9	-0.2	-17.4	2.2	2.8	-0.7**	-50.4	2.8	2.7	0.1	5.2

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TABLE E.VII.9 *(continued)*

	Employed				In School or Training				Neither Employed nor in School/Training			
Outcome	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c
Child Behavior Checklist—Aggressive Behavior	11.1	11.1	-0.0	-0.6	9.9	11.0	-1.1	-16.9	11.1	11.6	-0.6	-8.5
Child Health Status												
Child's Health Status	4.1	4.1	0.0	1.7	4.0	4.1	-0.1	-7.5	4.0	4.0	-0.1	-5.5
Percentage of Children in Fair or Poor Health***	5.5	10.1	-4.6	-16.2	8.6	4.9	3.7	13.0	9.7	7.7	2.0	7.2
Quality of the Home Environment and Parenting: Overall and Physical Environment												
Home Observation for Measurement of the Environment (HOME) Total Score	27.7	27.1	0.7	13.4	26.5	26.4	0.2	3.9	27.7	27.0	0.7**	13.9
HOME Internal Physical Environment	7.8	7.9	-0.1	-8.0	7.6	7.6	-0.0	-1.9	7.9	7.8	0.1	5.4
Parenting Behavior: Emotional Support												
HOME Warmth	2.7	2.6	0.1	14.6	2.4	2.3	0.1	5.5	2.6	2.5	0.1*	12.8
Supportiveness During Parent-Child Semistructured Play	4.1	4.0	0.2	16.1	3.9	3.7	0.3	28.6	4.0	3.9	0.1	5.0
Supportive Presence During Parent-Child Puzzle Challenge Task	4.8	4.8	-0.0	-0.8	4.1	4.1	-0.0	-0.2	4.5	4.4	0.1	7.8
Parenting Behavior: Stimulation of Language and Learning												
Percentage of Children with a Regular Bedtime***	61.5	54.9	6.6	13.4	53.0	33.6	-0.6	-1.2	62.2	61.6	0.6	1.2
Percentage of Children Who Follow a Bedtime Routine***	77.2	67.9	9.3*	20.0	67.3	61.7	3.6	7.7	69.0	70.0	-1.0	-2.1
HOME: Support of Language and Learning	10.7	10.4	0.3	13.5	10.4	10.2	0.2	7.0	10.6	10.3	0.3**	14.0
Parent-Child Play	4.3	4.4	-0.1	-9.7	4.6	4.4	0.1	17.0	24.4	4.4	0.1	11.9
Quality of Assistance During Parent-Child Puzzle Challenge Task	3.8	3.7	0.1	9.3	3.6	3.3	0.3	26.9	3.6	3.5	0.1	8.7

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TABLE E.VII.9 (*continued*)

	Employed				In School or Training				Neither Employed nor in School/Training			
Outcome	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c
Percentage of Parents Who Read to Child Daily***	57.3	53.5	3.8	7.6	57.5	55.8	1.7	3.4	58.8	50.0	8.7**	17.5
Percentage of Parents Who Read to Child at Bedtime***	41.0	31.5	9.6*	21.0	26.5	39.8	-13.3*	-29.3	33.0	27.1	5.8*	12.9
Parenting Behavior: Negative Parenting Behavior												
Detachment During Parent-Child Semistructured Play	1.2	1.2	-0.0	-1.8	1.5	1.4	0.1	15.5	1.2	1.2	-0.1	-8.3
Intrusiveness During Parent-Child Semistructured Play*	1.3	1.5	-0.2**	-26.4	1.8	1.7	0.1	6.1	1.5	1.5	0.0	5.2
Detachment During Parent-Child Puzzle Challenge Task	1.4	1.6	-0.2	-18.7	2.0	1.7	0.3	28.1	1.7	1.6	-0.1	9.8
Intrusiveness During Parent-Child Puzzle Challenge Task	2.4	2.7	-0.3**	-26.1	3.0	3.1	-0.1	-9.3	2.7	2.7	0.1	4.4
Negative Regard During Parent-Child Semistructured Play**	1.1	1.3	-0.2***	-32.1	1.4	1.4	0.1	12.9	1.3	1.2	0.0	6.8
HOME Harshness	0.3	0.3	-0.1	-2.2	0.4	0.3	0.1	10.9	0.3	0.2	0.0	7.1
Percentage of Parents Who Spanked Child in the Past Week***	43.6	53.6	-10.1*	-20.2	51.8	63.7	-12.0	-24.0	45.3	50.3	-5.0	-10.1
Knowledge of Safety Practices and Discipline Strategies												
Percentage of Parents Who Usually Use a Car Seat Correctly***	77.4	74.2	3.2	7.0	60.2	73.0	-12.8*	-27.8	73.0	71.1	1.9	4.1
Percentage of Parents Suggesting Physical Punishment as a Discipline Strategy***	38.5	46.1	-7.6	-15.1	59.9	60.5	-0.6	-1.2	41.7	48.7	-7.1**	-14.1
Percentage of Parents Who Would Use Mild Discipline Only***	53.5	48.4	5.1	10.4	31.7	32.7	-1.0	-2.0	49.1	42.7	6.3*	12.9

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TABLE E.VII.9 (*continued*)

	Employed				In School or Training				Neither Employed nor in School/Training			
Outcome	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c
Index of Severity of Discipline Strategies	3.1	3.3	-0.2	-11.4	3.9	3.8	0.1	4.5	3.2	3.5	-0.3***	-17.7
Parent Physical and Mental Health												
Parent's Health Status	3.6	3.4	0.2	15.6	3.6	3.6	-0.0	-1.8	3.3	3.4	-0.1	-8.6
Parenting Stress Index (PSI) Parental Distress	24.9	23.8	1.2	12.2	23.6	25.5	-1.9	-19.8	25.0	25.8	-0.8	-8.2
PSI Parent-Child Dysfunctional Interaction	17.6	16.9	0.7	11.0	17.5	18.6	-1.2	-19.1	18.0	17.8	0.2	3.4
Center for Epidemiological Studies Depression (CES-D; Short Form)	7.2	8.0	-0.9	-12.6	7.9	7.7	0.2	2.8	7.8	7.9	-0.1	-1.6
CES-D Severe Depressive Symptoms ***	13.6	17.6	-4.0	-11.2	17.7	11.4	6.4	17.6	16.4	16.8	-0.3	-0.9
Family Environment Scale (FES): Family Conflict	1.7	1.7	-0.1	-10.4	1.6	1.7	-0.1	-9.0	1.6	1.7	-0.0	-6.9
Father Presence												
Currently Married To Biological Father ***	45.1	39.2	5.9	12.1	14.9	18.6	-3.7	-7.7	41.3	44.1	-2.8	-5.7
Biological Father is Currently Married to, Lives with, or is Boyfriend of Respondent***	58.2	51.9	6.3	12.7	36.2	36.4	-0.2	-0.4	55.7	57.2	-1.6	-3.1
Biological Father Currently Present in Child's Life***	75.9	68.9	7.0	15.6	63.5	62.5	1.1	2.3	76.8	74.0	2.8	6.1
Continuous Biological Father Presence Child Age 14-36 Months***	64.9	64.3	0.6	1.2	51.1	61.3	-10.3	-22.3	74.3	74.4	-0.1	-0.2
No Biological Father Presence Child Age 14-36 Months***	13.7	15.8	-2.1	-6.7	15.7	13.3	2.5	7.9	9.2	8.6	0.6	1.8
Continuous Male Presence Child Age 14-36 Months***	81.9	89.4	-7.6	-21.1	75.4	78.3	-2.8	-7.9	82.3	84.5	-2.2	-6.2

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TABLE E.VII.9 (*continued*)

	Employed				In School or Training				Neither Employed nor in School/Training			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
No Male Presence Child Age 14-36 Months***	4.5	1.9	2.7	22.3	1.9	1.8	0.1	0.9	0.7	1.4	-0.8	-6.4
Sample Size												
Bayley	**226**	**178**	**404**		**194**	**158**	**352**		**425**	**413**	**838**	
Parent Interview	**270**	**230**	**500**		**234**	**201**	**435**		**567**	**535**	**1,102**	
Parent-Child Interactions	**224**	**188**	**412**		**193**	**154**	**347**		**427**	**411**	**838**	

SOURCE: Parent interviews, child assessments, interviewer observations, and assessments of semistructured parent-child interactions conducted when children were approximately 36 months old.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE E.VII.10

IMPACTS ON SELF-SUFFICIENCY AT 28 MONTHS, BY LABOR FORCE STATUS AT ENROLLMENT

	Employed				In School or Training				Neither Employed nor in School/Training			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Education/Job Training												
Ever in Education or Training***[d]	52.4	41.5	10.8*	21.6	82.7	78.2	4.5	9.1	53.8	43.5	10.3***	20.6
Ever in High School***	4.1	1.7	2.4	8.3	38.8	26.3	12.5**	43.9	3.4	2.6	0.7	2.6
Ever in ESL Class***	4.5	1.6	2.9	20.0	-0.1	0.7	-0.9	-5.9	3.8	3.4	0.4	3.0
Ever in Vocational Program***	17.2	13.9	3.4	8.9	25.6	20.7	4.9	13.0	18.7	16.9	1.7	4.6
Average Hours per Week in Education or Training	2.6	1.8	0.8	12.9	9.9	7.6	2.3*	36.4	2.7	2.0	0.7*	10.3
In Education or Training:												
1st Quarter***	14.4	20.0	-5.6*	-13.6	55.1	54.1	1.0	2.4	13.1	13.0	0.2	0.4
2nd Quarter***	17.3	20.1	-2.9	-6.6	56.7	54.9	1.8	4.2	17.5	15.9	1.6	3.7
3rd Quarter***	21.2	19.2	2.0	4.4	62.9	51.8	11.1*	25.2	22.0	17.8	4.2	9.4
4th Quarter***	23.1	20.7	2.4	5.6	58.0	44.8	13.2**	30.8	23.7	17.5	6.2**	14.4
5th Quarter***	24.5	18.8	5.7	13.3	54.1	47.6	6.6	15.2	24.1	17.7	6.3**	14.7
6th Quarter***	23.5	16.8	6.8	16.3	56.5	44.6	12.0*	28.8	23.0	16.7	6.2**	15.0
7th Quarter***	21.1	15.9	5.3	13.1	42.8	32.7	10.1	25.2	18.0	16.9	1.1	2.7
8th Quarter***	23.0	12.3	10.7**	27.3	39.7	33.1	6.6	16.8	19.7	15.3	4.4	11.1
Have High School Diploma***	62.5	60.0	2.6	5.1	47.5	44.5	3.0	6.0	47.5	48.7	-1.2	-2.3
Have GED***	8.1	11.3	-3.2	-10.1	13.6	12.8	0.9	2.7	11.7	12.6	-0.9	-2.8
Employment												
Ever Employed***	95.4	96.7	-1.3	-3.5	84.9	87.9	-2.9	-7.8	83.8	77.4	6.4**	17.1
Average Hours/Week Employed	28.3	27.4	1.0	6.6	11.9	13.8	-1.9	-12.7	14.3	14.0	0.3	2.1
Employed in:												
1st Quarter***	77.1	71.6	5.5	11.4	26.8	31.8	-5.0	-10.4	28.9	29.4	-0.5	-1.0
2nd Quarter***	79.4	71.1	8.3**	16.7	38.2	38.0	0.2	0.4	35.9	39.7	-3.8	-7.7
3rd Quarter***	83.1	78.8	4.4	8.7	47.0	51.2	-4.3	-8.5	44.5	42.3	2.2	4.5
4th Quarter***	81.3	81.3	0.0	0.0	53.6	54.6	-1.0	-2.0	48.6	46.8	1.8	3.7
5th Quarter***	84.1	84.1	0.0	0.0	57.6	61.2	-3.6	-7.3	54.1	52.6	1.6	3.2
6th Quarter***	82.2	77.1	5.1	10.3	53.5	61.7	-8.2	-16.6	57.7	52.9	4.8	9.6
7th Quarter***	76.5	76.8	-0.3	-0.6	49.2	56.2	-7.1	-14.3	54.3	49.8	4.5	9.2
8th Quarter***	75.6	79.1	-3.5	-7.1	52.0	61.9	-9.9	-20.2	60.0	54.8	5.2	10.7
Any Self-Sufficiency-Oriented Activity (Education, Training or Employment)												
Ever Employed or in Education/Training***	96.5	97.8	-1.3	-4.1	98.5	96.4	2.1	7.0	90.6	86.1	4.5*	14.7
Average Hours per Week in Any Activity	30.8	28.8	2.0	12.5	23.4	22.2	1.2	7.4	17.1	16.3	0.8	4.9
1st Quarter***	79.7	75.8	4.0	7.9	67.4	68.1	-0.7	-1.4	37.4	39.3	-1.8	-3.7
2nd Quarter***	82.2	74.4	7.8**	15.7	77.4	73.1	4.3	8.7	47.8	50.0	-2.0	-4.0

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TABLE E.VII.10 (*continued*)

	Employed				In School or Training				Neither Employed nor in School/Training			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
3rd Quarter***	87.3	83.1	4.2	8.8	83.0	79.5	3.6	7.5	58.0	53.5	4.6	9.6
4th Quarter***	87.2	85.1	2.2	4.5	83.9	78.8	5.2	10.8	62.1	55.0	7.1**	14.9
5th Quarter***	87.4	86.7	0.7	1.6	85.6	82.0	3.6	7.8	65.3	60.4	4.9	10.6
6th Quarter***	83.8	78.3	5.5	11.7	83.6	80.3	3.3	7.1	68.9	60.0	8.9**	19.0
7th Quarter***	79.5	79.4	0.1	0.3	72.3	73.3	-1.0	-2.1	64.3	57.7	6.6*	13.8
8th Quarter***	79.1	81.2	-2.1	-4.5	72.8	77.1	-4.2	-9.1	69.9	61.6	8.3**	17.8
AFDC/TANF Receipt												
Ever Received AFDC/TANF***	31.6	32.2	-0.6	-1.2	51.0	54.7	-3.7	-7.5	51.7	46.3	5.4**	10.8
Received AFDC/TANF in:												
1st Quarter***	16.7	17.1	-0.4	-0.9	37.3	31.0	6.3	13.5	40.3	36.7	3.6	7.8
2nd Quarter***	18.0	20.8	-2.8	-5.9	37.2	35.6	1.6	3.3	40.0	38.2	1.7	3.7
3rd Quarter***	22.7	22.9	-0.3	-0.6	40.1	40.5	-0.4	-0.9	41.9	37.4	4.6*	9.5
4th Quarter***	18.2	21.9	-3.8	-8.1	33.2	38.2	-5.0	-10.8	35.9	32.3	3.6	7.8
5th Quarter***	14.0	20.8	-6.8**	-14.8	35.7	33.9	1.7	3.8	35.0	31.4	3.7	8.0
6th Quarter***	12.3	18.2	-5.8	-12.6	28.9	35.9	-7.0	-15.2	35.8	31.8	4.0	8.8
7th Quarter***	10.7	14.7	-4.0	-9.1	27.3	35.6	-8.3	-18.8	27.6	26.8	0.9	2.0
8th Quarter***	9.6	10.5	-0.9	-2.1	27.5	35.0	-7.5	-17.7	27.8	24.0	3.8	8.9
Total AFDC/TANF Benefits ($)*	$583	$533	$50	1.3	$1,815	$2,064	-$248	-6.4	$2,852	$2,563	$290	7.5
Receipt of Other Welfare Benefits												
Ever Received Welfare***	59.6	57.2	2.4	5.1	68.6	75.1	-6.5	-13.9	72.2	67.6	4.6*	9.9
Total Welfare Benefits ($)*	$2,332	$3,263	-$931	-12.3	$4,674	$3,405	$1,270	16.8	$6,870	$6,624	$246	3.3
Ever Received Food Stamps***	52.8	53.9	-1.1	-2.2	57.3	63.6	-6.3	-12.9	64.8	62.4	2.4	4.8
Total Food Stamp Benefits ($)	$1,038	$1,177	-$139	-5.1	$2,312	$2,425	-$114	-4.2	$2,531	$2,435	$96	3.5
Income/Poverty												
Income Above Poverty Level***	46.7	50.8	-4.1	-8.3	33.3	27.6	5.7	11.5	41.1	44.1	-3.0	-6.0
Subsequent Births												
Subsequent Birth by 24 Months after Random Assignment***	22.0	27.4	-5.4	-12.1	25.7	37.7	-12.0*	-26.8	23.9	31.4	-7.5**	-16.7
Sample Size	**253**	**226**	**479**		**231**	**205**	**436**		**557**	**544**	**1,101**	

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

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TABLE E.VII.10 (*continued*)

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE E.VII.11

IMPACTS ON SERVICE RECEIPT DURING THE FIRST 28 MONTHS, BY HIGHEST GRADE COMPLETED AT ENROLLMENT

	Less than 12th Grade			12th Grade			More than 12th Grade		
	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant
Any Services									
Any Key Services***[a,b]	94.9	79.2	15.8***	97.4	83.5	13.8***	97.3	86.0	11.3***
Any Home Visits Or Center-Based Child Care***	91.2	53.0	38.2***	96.6	60.0	36.6***	97.3	62.5	34.8***
More Than 1 Home Visit or 2 Weeks Center-Based Child Care***	89.0	45.1	43.8***	96.0	54.9	41.1***	96.1	57.8	38.4***
Home Visits or Center Care at Required Intensity in at Least 1 Followup***	68.4	12.6	55.7***	78.1	11.7	66.4***	85.6	11.5	74.1***
Home Visits or Center Care at Required Intensity in All 3 Followups***	44.3	4.2	40.1***	35.1	2.1	33.0***	42.1	5.8	36.2***
Home Visits									
Any Home Visits***	86.2	36.8	49.4***	89.9	34.3	55.6***	91.4	30.3	61.1***
Any Child Development Services During Home Visits***	84.3	32.7	51.6***	91.3	32.7	58.6***	90.7	28.4	62.3***
Weekly Home Visits, 1st Follow-Up Period***	45.7	4.6	41.2***	49.4	4.4	45.0***	60.5	0.8	59.7***
Weekly Home Visits, 2nd Follow-Up Period***	33.9	2.1	31.8***	40.6	3.9	36.7***	44.8	1.6	43.2***
Weekly Home Visits, 3rd Follow-Up Period***	26.7	4.1	22.6***	34.8	2.8	32.0***	29.2	0.6	28.6***
Weekly Home Visits in At Least 1 Followup***	59.0	8.3	50.7***	62.8	6.1	56.7***	66.5	1.4	65.1***
Weekly Home Visits in All 3 Followups***	17.3	0.3	17.0***	25.4	0.8	24.6***	26.1	0.3	25.7***
Child Care									
Any Child Care***	84.7	77.5	7.2***	88.6	84.8	3.8	91.2	83.0	8.3**
Any Center-Based Child Care***	47.3	29.1	18.2***	53.4	36.1	17.3***	53.6	42.2	11.4**
Average Hours Per Week of Center-Based Care	5.0	2.1	3.0***	6.1	2.3	3.8***	6.1	4.4	1.6
Concurrent Child Care Arrangements***	50.6	42.2	8.4**	58.2	54.5	3.7	48.7	52.1	-3.4
Average Weekly Out-of-Pocket Cost of Care***	$3.73	$4.86	-$1.13	$5.27	$6.11	-$0.84	$4.43	$14.48	-$10.06***
Received a Child Care Subsidy***	26.7	32.8	-3.1	36.1	38.3	-2.2	33.7	28.1	5.5
Child Was in Care at 12 Months of Age***	63.8	54.1	9.6***	65.3	63.7	1.6	65.9	55.9	10.0*
Child Was in Care at 24 Months of Age***	57.9	51.1	6.8	57.8	51.2	6.6	68.5	67.2	1.3
Case Management									
Any Case Management Meetings***	85.6	56.9	28.7***	92.1	64.5	27.5***	89.8	56.4	33.4***
Weekly Case Management, 1st Follow-Up Period***	43.5	8.8	34.6***	50.0	9.2	40.9***	54.2	9.9	44.4***
Weekly Case Management, 2nd Follow-Up Period***	30.6	4.4	26.1***	43.0	8.4	34.6***	41.4	1.4	40.0***
Weekly Case Management, 3rd Follow-Up Period***	27.8	4.0	23.8***	32.0	9.2	22.8***	35.7	2.9	32.8***

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TABLE E.VII.11 (*continued*)

	Less than 12th Grade			12th Grade			More than 12th Grade		
	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant
Group Activities									
Any Group Parenting Activities***	67.8	34.3	33.5***	69.8	36.1	33.7***	77.4	43.3	34.1***
Any Parent-Child Group Activities**	36.7	10.9	25.8***	38.6	14.8	23.8***	45.5	20.6	24.9***
Early Intervention Services									
Identification of Child's Disability***	6.2	5.2	1.0	7.9	5.9	2.0	12.0	7.2	4.8*
Services for Child With Disability***	3.72	3.1	0.6	6.1	4.1	2.0	7.3	4.3	2.9
Child Health Services									
Any Child Health Services**	100.0	99.6	0.5	100.0	100.0	0.0	100.0	100.0	0.0
Any Doctor Visits***	98.6	97.7	0.9	100.0	99.7	0.3	99.3	99.6	-0.4
Any Emergency Room Visits***	54.1	55.9	-1.8	59.4	59.2	0.1	56.0	48.2	7.8
Number of Emergency Room Visits for Injuries	0.2	0.4	-0.1**	0.2	0.3	-0.0	0.3	0.3	0.0
Any Dentist Visits***	26.9	24.8	2.1	31.6	21.9	9.7**	31.2	28.2	3.0
Any Screening Tests***	63.4	66.9	-3.6	69.4	63.2	6.2	70.6	67.4	3.1
Any Immunizations***	98.3	97.3	0.9	98.9	98.4	0.5	100.0	98.8	1.2
Family Development Services									
Any Education-Related Services***	91.2	67.1	24.0***	84.4	52.6	31.8***	88.2	57.6	30.6***
Any Employment-Related Services***	75.2	46.5	28.7***	82.3	54.4	28.0***	80.2	47.4	32.8***
Any Family Health Services[c]	100.0	100.0	0.0	100.0	100.0	0.0	100.0	100.0	0.0
Any Family Mental Health Services***	20.4	18.3	2.1	27.0	25.8	1.2	25.3	24.0	1.3
Transportation Assistance***	31.9	24.6	7.3**	37.8	25.4	12.4***	34.8	18.7	16.1***
Housing Assistance***	56.6	57.0	-0.5	63.8	65.8	-2.0	54.1	44.5	9.6**
Sample Size	**475**	**448**	**923**	**292**	**283**	**575**	**269**	**239**	**508**

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroups are included in the estimates for each subgroup.

[a] Home visits, case management, center-based child care, and/or group parenting activities.

[b] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups in the first two columns. The third column is a subset of the second column and is included to aid interpretation of subgroup differences.

[c] There is no variance across subgroups due to lack of variance in level of services.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE E.VII.12

IMPACTS ON CHILD AND FAMILY OUTCOMES AT AGE 3, BY HIGHEST GRADE COMPLETED AT ENROLLMENT

	Less than 12th Grade				12th Grade				More than 12th Grade			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Child Cognitive and Language Development												
Bayley Mental Development Index (MDI) Standard Score	89.9	87.8	2.0*	15.6	92.8	90.0	2.8*	21.5	95.3	96.5	-1.2	-9.3
Percentage with MDI < 85***[d]	29.7	37.0	-7.3*	-15.8	23.0	31.6	-8.9	-18.4	20.0	16.5	3.5	7.6
Peabody Picture Vocabulary Test (PPVT)-III Standard Score	80.0	79.4	0.6	3.8	85.9	82.1	3.8**	23.2	93.4	93.7	-0.4	-2.2
Percentage with PPVT-III < 85***	62.9	62.5	0.4	0.8	40.9	53.2	-12.3*	-24.6	24.6	27.0	-2.4	-4.7
Child Social-Emotional Development												
Engagement of Parent During Parent-Child Semistructured Play	4.6	4.5	0.1	11.0	5.0	4.7	0.3**	26.7	5.0	4.9	0.1	9.4
Sustained Attention with Objects During Parent-Child Semistructured Play	4.9	4.7	0.2**	19.8	5.2	4.9	0.2*	22.0	5.2	5.1	0.1	8.3
Engagement of Parent During Parent-Child Puzzle Challenge Task	4.9	4.9	0.0	3.8	5.2	5.0	0.2	17.1	5.2	5.0	0.1	13.7
Persistence During Parent-Child Puzzle Challenge Task	4.4	4.4	-0.0	-0.1	4.8	4.5	0.3**	26.3	5.0	4.8	0.1	9.8
Bayley Behavioral Rating Scale (BRS): Emotional Regulation	3.9	3.9	-0.0	-1.0	3.9	3.9	0.0	5.5	4.1	4.1	-0.0	-1.1
Bayley BRS: Orientation/ Engagement	3.8	3.8	0.0	0.6	3.9	3.9	0.1	6.4	4.1	4.2	-0.1	-13.0
Negativity Toward Parent During Parent-Child Semistructured Play	1.3	1.3	0.0	0.5	1.2	1.4	-0.2***	-33.9	1.2	1.3	-0.1	-11.1
Frustration During Parent-Child Puzzle Challenge Task	2.6	2.6	-0.0	-1.4	2.9	3.0	-0.1	-5.2	2.7	2.9	-0.3	-18.8

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TABLE E.VII.12 *(continued)*

	Less than 12th Grade				12th Grade				More than 12th Grade			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Child Behavior Checklist—Aggressive Behavior	10.7	11.4	-0.7	-10.9	11.6	11.4	0.2	2.7	10.1	11.3	-1.2*	-19.3
Child Health Status												
Child's Health Status	4.0	4.0	-0.0	-2.6	4.0	3.9	0.1	9.6	4.1	4.3	-0.2	15.9
Percentage of Children in Fair or Poor Health***	8.9	8.3	0.5	1.9	5.8	10.1	-4.2	-14.9	7.0	2.7	4.3	15.1
Quality of the Home Environment and Parenting: Overall and Physical Environment												
Home Observation for Measurement of the Environment (HOME) Total Score	26.0	25.7	0.3	6.2	28.2	27.9	0.4	7.2	29.8	29.9	-0.1	-2.2
HOME Internal Physical Environment	7.5	7.6	-0.1	-7.7	7.9	7.9	0.0	1.1	8.0	8.2	-0.2	-16.0
Parenting Behavior: Emotional Support												
HOME Warmth	2.4	2.3	0.1	7.4	2.7	2.5	0.1	13.2	2.7	2.8	-0.1	-8.9
Supportiveness During Parent-Child Semistructured Play	3.8	3.7	0.1	9.1	4.2	4.0	0.1	14.6	4.4	4.3	0.1	12.7
Supportive Presence During Parent-Child Puzzle Challenge Task	4.1	4.2	-0.1	-7.1	4.8	4.6	0.2*	18.1	5.1	5.1	-0.1	-3.8
Parenting Behavior: Stimulation of Language and Learning												
Percentage of Children with a Regular Bedtime***	57.4	64.3	2.4	4.9	63.0	57.1	6.0	12.1	64.3	64.3	0.1	0.2
Percentage of Children Who Follow a Bedtime Routine***	67.6	4.3	3.3	7.2	71.4	71.4	-0.0	-0.1	75.9	73.9	2.0	4.3
HOME: Support of Language and Learning**	10.2	10.0	0.3	12.1	10.9	10.7	0.2	10.7	11.3	11.8	-0.5**	-21.4
Parent-Child Play	4.4	4.3	0.1	11.4	4.4	4.3	0.1	7.5	4.5	4.4	0.1	15.1
Quality of Assistance During Parent-Child Puzzle Challenge Task	3.3	3.3	0.0	1.0	3.8	3.5	0.3**	28.6	4.0	4.0	0.0	1.3
Percentage of Parents Who Read to Child Daily***	51.7	47.3	4.5	9.0	60.3	52.7	7.6	15.1	69.2	59.9	9.3*	18.7

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TABLE E.VII.12 (*continued*)

	Less than 12th Grade				12th Grade				More than 12th Grade			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Percentage of Parents Who Read to Child at Bedtime***	24.1	23.9	0.2	0.5	34.0	31.7	2.3	5.0	50.6	39.1	11.5**	25.3
Parenting Behavior: Negative Parenting Behavior												
Detachment During Parent-Child Semistructured Play	1.3	1.3	-0.0	-6.4	1.2	1.2	-0.0	-3.5	1.1	1.1	-0.0	-0.4
Intrusiveness During Parent-Child Semistructured Play	1.7	1.7	-0.0	-0.1	1.4	1.5	-0.1	-10.9	1.4	1.4	-0.0	-4.6
Detachment During Parent-Child Puzzle Challenge Task	1.9	1.8	0.1	9.1	1.5	1.6	-0.1	-10.8	1.5	1.5	-0.1	-5.7
Intrusiveness During Parent-Child Puzzle Challenge Task	2.8	2.9	-0.1	-4.3	2.4	2.6	-0.2	-19.1	2.3	2.4	-0.1	-6.0
Negative Regard During Parent-Child Semistructured Play	1.4	1.3	0.0	7.3	1.2	1.3	-0.1	-12.7	1.2	1.2	-0.1	-9.5
HOME Harshness	0.4	0.4	0.0	2.7	0.3	0.2	0.0	5.9	0.3	0.3	-0.0	-4.2
Percentage of Parents Who Spanked Child in the Past Week***	48.2	52.6	-4.4	-8.8	44.3	52.2	-7.9	-15.8	47.1	60.4	-13.3**	-26.7
Knowledge of Safety Practices and Discipline Strategies												
Percentage of Parents Who Usually Use a Car Seat Correctly***	62.6	65.5	-2.9	-6.4	72.1	70.1	2.0	4.5	81.3	79.4	1.9	4.2
Percentage of Parents Suggesting Physical Punishment as a Discipline Strategy***	52.5	55.0	-2.5	-5.0	44.6	49.7	-5.2	-10.3	37.4	44.6	-7.2	-14.4
Percentage of Parents Who Would Use Mild Discipline Only***	40.6	36.9	3.6	7.4	45.3	43.3	2.0	4.1	52.0	49.2	2.7	5.5
Index of Severity of Discipline Strategies	3.6	3.7	-0.1	-6.0	3.3	3.5	-0.2	-9.1	3.1	3.3	-0.2	-12.6
Parent Physical and Mental Health												
Parent's Health Status	3.4	3.4	-0.0	-2.4	3.4	3.5	-0.0	-2.6	3.6	3.6	-0.1	-5.9
Parenting Stress Index (PSI) Parental Distress	25.4	27.1	-1.7**	-17.6	25.5	24.4	1.1	11.4	23.0	23.5	-0.4	-4.5

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TABLE E.VII.12 *(continued)*

	Less than 12th Grade				12th Grade				More than 12th Grade			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
PSI Parent-Child Dysfunctional Interaction	18.7	19.0	-0.3	-5.1	18.0	17.0	1.1*	17.5	16.8	16.6	0.1	2.0
Center for Epidemiological Studies Depression (CES-D; Short Form)	8.3	8.1	0.3	3.5	7.8	8.6	-0.8	-11.3	7.2	7.5	-0.4	-5.3
CES-D Severe Depressive Symptoms ***	19.9	14.9	5.1	14.1	12.9	19.7	-6.8*	-18.9	12.6	12.6	0.0	0.0
Family Environment Scale (FES): Family Conflict	1.7	1.7	0.0	3.1	1.6	1.7	-0.1	-16.5	1.6	1.7	-0.0	-4.6
Father Presence												
Currently Married To Biological Father ***	29.7	27.4	2.3	4.8	3.9.3	41.0	-1.7	-3.5	38.8	39.4	-0.6	-1.2
Biological Father is Currently Married to, Lives with, or is Boyfriend of Respondent***	46.5	45.1	1.4	2.9	54.2	55.0	-0.8	-1.6	48.6	47.1	1.5	3.1
Biological Father Currently Present in Child's Life***	70.6	67.5	3.2	7.0	75.2	74.1	1.1	2.5	74.9	58.8	6.0	13.5
Continuous Biological Father Presence Child Age 14-36 Months***	58.7	61.4	-2.7	-5.9	69.3	74.0	-4.8	-10.4	72.3	72.1	0.1	0.2
No Biological Father Presence Child Age 14-36 Months***	11.9	13.9	-2.0	-6.5	11.3	8.5	2.8	8.8	10.8	14.4	-3.6	-11.3
Continuous Male Presence Child Age 14-36 Months***	77.2	79.1	-1.8	-5.1	82.0	85.3	-3.3	-9.2	87.6	90.7	-3.2	-8.9
No Male Presence Child Age 14-36 Months***	0.8	2.0	-1.3	-10.5	2.8	1.2	1.6	13.4	2.1	2.8	-0.7	-5.8
Sample Size												
Bayley	394	347	741		237	216	453		212	182	394	
Parent Interview	484	438	922		312	280	592		272	244	516	
Parent-Child Interactions	395	347	742		246	211	457		200	192	392	

SOURCE: Parent interviews, child assessments, interviewer observations, and assessments of semistructured parent-child interactions conducted when children were approximately 36 months old.

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TABLE E.VII.12 (*continued*)

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE E.VII.12

IMPACTS ON CHILD AND FAMILY OUTCOMES AT AGE 3, BY HIGHEST GRADE COMPLETED AT ENROLLMENT

	Less than 12th Grade				12th Grade				More than 12th Grade			
Outcome	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c
Child Cognitive and Language Development												
Bayley Mental Development Index (MDI) Standard Score	89.9	87.8	2.0*	15.6	92.8	90.0	2.8*	21.5	95.3	96.5	-1.2	-9.3
Percentage with MDI < 85***^{d}	29.7	37.0	-7.3*	-15.8	23.0	31.6	-8.9	-18.4	20.0	16.5	3.5	7.6
Peabody Picture Vocabulary Test (PPVT)-III Standard Score	80.0	79.4	0.6	3.8	85.9	82.1	3.8**	23.2	93.4	93.7	-0.4	-2.2
Percentage with PPVT-III < 85***	62.9	62.5	0.4	0.8	40.9	53.2	-12.3*	-24.6	24.6	27.0	-2.4	-4.7
Child Social-Emotional Development												
Engagement of Parent During Parent-Child Semistructured Play	4.6	4.5	0.1	11.0	5.0	4.7	0.3**	26.7	5.0	4.9	0.1	9.4
Sustained Attention with Objects During Parent-Child Semistructured Play	4.9	4.7	0.2**	19.8	5.2	4.9	0.2*	22.0	5.2	5.1	0.1	8.3
Engagement of Parent During Parent-Child Puzzle Challenge Task	4.9	4.9	0.0	3.8	5.2	5.0	0.2	17.1	5.2	5.0	0.1	13.7
Persistence During Parent-Child Puzzle Challenge Task	4.4	4.4	-0.0	-0.1	4.8	4.5	0.3**	26.3	5.0	4.8	0.1	9.8
Bayley Behavioral Rating Scale (BRS): Emotional Regulation	3.9	3.9	-0.0	-1.0	3.9	3.9	0.0	5.5	4.1	4.1	-0.0	-1.1
Bayley BRS: Orientation/ Engagement	3.8	3.8	0.0	0.6	3.9	3.9	0.1	6.4	4.1	4.2	-0.1	-13.0
Negativity Toward Parent During Parent-Child Semistructured Play	1.3	1.3	0.0	0.5	1.2	1.4	-0.2***	-33.9	1.2	1.3	-0.1	-11.1
Frustration During Parent-Child Puzzle Challenge Task	2.6	2.6	-0.0	-1.4	2.9	3.0	-0.1	-5.2	2.7	2.9	-0.3	-18.8

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TABLE E.VII.12 *(continued)*

	Less than 12th Grade				12th Grade				More than 12th Grade			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Child Behavior Checklist—Aggressive Behavior	10.7	11.4	-0.7	-10.9	11.6	11.4	0.2	2.7	10.1	11.3	-1.2*	-19.3
Child Health Status												
Child's Health Status	4.0	4.0	-0.0	-2.6	4.0	3.9	0.1	9.6	4.1	4.3	-0.2	15.9
Percentage of Children in Fair or Poor Health***	8.9	8.3	0.5	1.9	5.8	10.1	-4.2	-14.9	7.0	2.7	4.3	15.1
Quality of the Home Environment and Parenting: Overall and Physical Environment												
Home Observation for Measurement of the Environment (HOME) Total Score	26.0	25.7	0.3	6.2	28.2	27.9	0.4	7.2	29.8	29.9	-0.1	-2.2
HOME Internal Physical Environment	7.5	7.6	-0.1	-7.7	7.9	7.9	0.0	1.1	8.0	8.2	-0.2	-16.0
Parenting Behavior: Emotional Support												
HOME Warmth	2.4	2.3	0.1	7.4	2.7	2.5	0.1	13.2	2.7	2.8	-0.1	-8.9
Supportiveness During Parent-Child Semistructured Play	3.8	3.7	0.1	9.1	4.2	4.0	0.1	14.6	4.4	4.3	0.1	12.7
Supportive Presence During Parent-Child Puzzle Challenge Task	4.1	4.2	-0.1	-7.1	4.8	4.6	0.2*	18.1	5.1	5.1	-0.1	-3.8
Parenting Behavior: Stimulation of Language and Learning												
Percentage of Children with a Regular Bedtime***	57.4	64.3	2.4	4.9	63.0	57.1	6.0	12.1	64.3	64.3	0.1	0.2
Percentage of Children Who Follow a Bedtime Routine***	67.6	4.3	3.3	7.2	71.4	71.4	-0.0	-0.1	75.9	73.9	2.0	4.3
HOME: Support of Language and Learning**	10.2	10.0	0.3	12.1	10.9	10.7	0.2	10.7	11.3	11.8	-0.5**	-21.4
Parent-Child Play	4.4	4.3	0.1	11.4	4.4	4.3	0.1	7.5	4.5	4.4	0.1	15.1
Quality of Assistance During Parent-Child Puzzle Challenge Task	3.3	3.3	0.0	1.0	3.8	3.5	0.3**	28.6	4.0	4.0	0.0	1.3
Percentage of Parents Who Read to Child Daily***	51.7	47.3	4.5	9.0	60.3	52.7	7.6	15.1	69.2	59.9	9.3*	18.7

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TABLE E.VII.12 (*continued*)

	Less than 12th Grade				12th Grade				More than 12th Grade			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Percentage of Parents Who Read to Child at Bedtime***	24.1	23.9	0.2	0.5	34.0	31.7	2.3	5.0	50.6	39.1	11.5**	25.3
Parenting Behavior: Negative Parenting Behavior												
Detachment During Parent-Child Semistructured Play	1.3	1.3	-0.0	-6.4	1.2	1.2	-0.0	-3.5	1.1	1.1	-0.0	-0.4
Intrusiveness During Parent-Child Semistructured Play	1.7	1.7	-0.0	-0.1	1.4	1.5	-0.1	-10.9	1.4	1.4	-0.0	-4.6
Detachment During Parent-Child Puzzle Challenge Task	1.9	1.8	0.1	9.1	1.5	1.6	-0.1	-10.8	1.5	1.5	-0.1	-5.7
Intrusiveness During Parent-Child Puzzle Challenge Task	2.8	2.9	-0.1	-4.3	2.4	2.6	-0.2	-19.1	2.3	2.4	-0.1	-6.0
Negative Regard During Parent-Child Semistructured Play	1.4	1.3	0.0	7.3	1.2	1.3	-0.1	-12.7	1.2	1.2	-0.1	-9.5
HOME Harshness	0.4	0.4	0.0	2.7	0.3	0.2	0.0	5.9	0.3	0.3	-0.0	-4.2
Percentage of Parents Who Spanked Child in the Past Week***	48.2	52.6	-4.4	-8.8	44.3	52.2	-7.9	-15.8	47.1	50.4	-13.3**	-26.7
Knowledge of Safety Practices and Discipline Strategies												
Percentage of Parents Who Usually Use a Car Seat Correctly***	62.6	65.5	-2.9	-6.4	72.1	70.1	2.0	4.5	81.3	79.4	1.9	4.2
Percentage of Parents Suggesting Physical Punishment as a Discipline Strategy***	52.5	55.0	-2.5	-5.0	44.6	49.7	-5.2	-10.3	37.4	44.6	-7.2	-14.4
Percentage of Parents Who Would Use Mild Discipline Only***	40.6	36.9	3.6	7.4	45.3	43.3	2.0	4.1	52.0	49.2	2.7	5.5
Index of Severity of Discipline Strategies	3.6	3.7	-0.1	-6.0	3.3	3.5	-0.2	-9.1	3.1	3.3	-0.2	-12.6
Parent Physical and Mental Health												
Parent's Health Status	3.4	3.4	-0.0	-2.4	3.4	3.5	-0.0	-2.6	3.6	3.6	-0.1	-5.9
Parenting Stress Index (PSI) Parental Distress	25.4	27.1	-1.7**	-17.6	25.5	24.4	1.1	11.4	23.0	23.5	-0.4	-4.5

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TABLE E.VII.12 *(continued)*

	Less than 12th Grade				12th Grade				More than 12th Grade			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
PSI Parent-Child Dysfunctional Interaction	18.7	19.0	-0.3	-5.1	18.0	17.0	1.1*	17.5	16.8	16.6	0.1	2.0
Center for Epidemiological Studies Depression (CES-D; Short Form)	8.3	8.1	0.3	3.5	7.8	8.6	-0.8	-11.3	7.2	7.5	-0.4	-5.3
CES-D Severe Depressive Symptoms ***	19.9	14.9	5.1	14.1	12.9	19.7	-6.8*	-18.9	12.6	12.6	0.0	0.0
Family Environment Scale (FES): Family Conflict	1.7	1.7	0.0	3.1	1.6	1.7	-0.1	-16.5	1.6	1.7	-0.0	-4.6
Father Presence												
Currently Married To Biological Father ***	29.7	27.4	2.3	4.8	3.9.3	41.0	-1.7	-3.5	38.8	39.4	-0.6	-1.2
Biological Father is Currently Married to, Lives with, or is Boyfriend of Respondent***	46.5	45.1	1.4	2.9	54.2	55.0	-0.8	-1.6	48.6	47.1	1.5	3.1
Biological Father Currently Present in Child's Life***	70.6	67.5	3.2	7.0	75.2	74.1	1.1	2.5	74.9	68.8	6.0	13.5
Continuous Biological Father Presence Child Age 14-36 Months***	58.7	61.4	-2.7	-5.9	69.3	74.0	-4.8	-10.4	72.3	72.1	0.1	0.2
No Biological Father Presence Child Age 14-36 Months***	11.9	13.9	-2.0	-6.5	11.3	8.5	2.8	8.8	10.8	14.4	-3.6	-11.3
Continuous Male Presence Child Age 14-36 Months***	77.2	79.1	-1.8	-5.1	82.0	85.3	-3.3	-9.2	87.6	90.7	-3.2	-8.9
No Male Presence Child Age 14-36 Months***	0.8	2.0	-1.3	-10.5	2.8	1.2	1.6	13.4	2.1	2.8	-0.7	-5.8
Sample Size												
Bayley	394	347	741		237	216	453		212	182	394	
Parent Interview	484	438	922		312	280	592		272	244	516	
Parent-Child Interactions	395	347	742		246	211	457		200	192	392	

SOURCE: Parent interviews, child assessments, interviewer observations, and assessments of semistructured parent-child interactions conducted when children were approximately 36 months old.

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TABLE E.VII.12 (*continued*)

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE E.VII.13

IMPACTS ON SELF-SUFFICIENCY AT 28 MONTHS, BY HIGHEST GRADE COMPLETED AT ENROLLMENT

	Less than 12th Grade				12th Grade				More than 12th Grade			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Education/Job Training												
Ever in Education or Training***[d]	68.7	62.2	6.5*	12.9	47.7	39.0	8.7*	17.4	60.8	52.1	8.8*	17.5
Ever in High School***	28.9	22.1	6.7**	23.6	-0.1	0.4	-0.4	-1.4	0.0	0.0	0.0	0.0
Ever in ESL Class***	4.2	3.4	0.8	5.6	4.0	2.4	1.6	11.2	1.3	4.8	-3.5***	-24.5
Ever in Vocational Program***	18.0	18.6	-0.7	-1.8	25.2	15.7	9.4**	25.0	21.6	13.9	7.7*	20.4
Average Hours per Week in Education or Training*	6.7	4.8	2.0***	31.2	2.3	1.4	0.9*	13.8	3.4	3.3	0.1	1.0
In Education or Training:												
1st Quarter***	28.6	26.6	2.1	5.0	10.3	12.3	-2.0	-4.9	23.0	25.9	-2.9	-6.9
2nd Quarter***	33.7	30.6	3.1	7.1	13.4	13.8	-0.4	-1.0	26.7	78.5	-1.8	-4.1
3rd Quarter***	39.8	31.7	8.1**	18.4	20.3	15.2	5.1	11.5	27.0	29.3	-2.3	-5.1
4th Quarter***	39.9	26.7	13.1***	30.5	19.3	15.3	4.0	9.3	28.1	29.6	-1.5	-3.5
5th Quarter***	36.6	28.1	8.5**	19.8	20.7	15.1	5.7	13.1	31.9	27.9	4.0	9.3
6th Quarter***	35.3	28.2	7.2**	17.2	24.4	12.4	12.1***	29.1	26.1	25.0	1.1	2.6
7th Quarter***	29.8	25.1	4.7	11.8	17.2	12.4	4.8	11.9	24.8	25.2	-0.3	-0.9
8th Quarter***	29.0	25.3	3.8	9.6	19.6	11.6	8.0**	20.4	28.2	22.9	5.3	13.4
Have High School Diploma***	18.8	20.7	-1.9	-3.8	76.1	69.6	6.5	13.0	74.9	82.2	-7.2*	-14.5
Have GED***	12.6	12.2	0.4	1.2	14.4	18.1	-3.7	-11.5	5.6	5.5	0.1	0.2
Employment												
Ever Employed***	85.1	82.7	2.4	6.3	90.6	84.8	5.8*	15.6	90.2	87.6	2.6	6.9
Average Hours/Week Employed	13.0	13.8	-0.8	-5.6	21.8	19.5	2.3	15.6	21.4	19.8	1.6	11.1
Employed in:												
1st Quarter***	28.0	31.6	-3.6	-7.5	47.5	49.1	-1.6	-3.3	51.8	41.4	10.4**	21.4
2nd Quarter***	36.0	38.5	-2.6	-5.1	54.4	54.2	0.1	0.3	57.9	49.1	8.8**	17.6
3rd Quarter***	42.6	47.6	-5.0	-10.0	62.4	58.1	4.3	8.6	64.8	58.7	6.2	12.4
4th Quarter***	49.3	48.9	0.4	0.8	64.5	59.6	5.0	10.0	66.1	65.9	0.2	0.5
5th Quarter***	53.9	53.4	0.6	1.2	69.9	64.7	5.3	10.7	70.0	68.7	1.5	2.7
6th Quarter***	58.9	55.1	3.8	7.7	72.6	60.6	12.0**	24.3	72.6	69.2	3.4	6.9
7th Quarter***	55.3	52.4	2.9	5.8	65.8	57.8	8.1*	16.3	68.6	67.4	1.2	2.4
8th Quarter***	59.1	59.1	0.0	0.0	69.0	61.8	7.2	14.8	71.5	69.0	2.5	5.2
Any Self-Sufficiency-Oriented Activity (Education, Training or Employment)												
Ever Employed or in Education/Training***	94.7	91.5	3.2	10.6	94.6	88.4	6.2**	20.5	96.7	93.0	3.7	12.0
Average Hours per Week in Any Activity	20.8	18.8	2.0	12.9	24.3	21.4	2.9*	18.3	25.1	23.7	1.4	8.9

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TABLE E.VII.13 (*continued*)

	Less than 12th Grade				12th Grade				More than 12th Grade			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
In Activities in:												
1st Quarter***	48.5	48.9	-0.4	-0.8	54.8	54.7	0.1	0.3	62.6	54.8	7.8*	15.5
2nd Quarter***	58.8	56.7	2.1	4.2	61.9	61.2	0.7	1.5	71.0	59.6	11.4***	23.1
3rd Quarter***	67.0	64.3	2.8	5.8	72.7	67.9	4.9	10.3	78.0	70.7	7.3*	15.4
4th Quarter***	71.0	62.6	8.4**	17.7	74.3	66.8	7.5*	15.8	76.2	73.0	3.2	6.7
5th Quarter***	72.2	66.3	5.9*	12.8	76.8	70.8	6.1	13.1	80.1	76.1	4.0	8.7
6th Quarter***	75.9	66.7	9.2**	19.6	80.3	64.0	16.3***	34.7	81.9	75.4	6.6	13.9
7th Quarter***	70.1	65.2	4.8	10.1	72.3	63.1	9.1**	19.1	79.1	72.9	6.1	12.8
8th Quarter***	73.2	68.7	4.5	9.6	73.8	65.6	8.2*	17.6	81.9	75.6	5.3	11.4
AFDC/TANF Receipt												
Ever Received AFDC/TANF***	55.2	51.4	3.8	7.6	46.2	45.1	1.1	2.2	31.9	32.8	-0.9	-1.8
Received AFDC/TANF in:												
1st Quarter***	40.4	33.4	7.0***	15.0	34.4	32.2	2.2	4.6	22.8	23.4	-0.6	-1.3
2nd Quarter***	40.8	35.9	5.0*	10.5	35.0	36.6	-1.6	-3.3	23.6	24.0	-0.4	-0.9
3rd Quarter***	43.7	38.5	5.2*	10.9	35.6	35.8	-0.2	-0.4	27.0	24.6	2.4	5.0
4th Quarter***	38.0	32.7	5.3*	11.5	27.9	31.6	-3.7	-8.1	21.5	21.5	0.0	-0.1
5th Quarter***	35.8	33.1	2.7	5.9	28.5	31.2	-2.7	-5.9	20.2	20.2	0.0	0.0
6th Quarter***	34.4	35.6	-1.2	-2.6	26.3	30.5	-4.2	-9.0	17.3	13.3	-1.0	-2.3
7th Quarter***	29.9	32.4	-2.4	-5.5	18.6	24.5	-5.9	-13.4	13.1	12.5	0.6	1.4
8th Quarter***	30.3	29.5	0.8	1.8	17.6	22.5	-4.9	-11.5	11.7	11.5	0.3	0.6
Total AFDC/TANF Benefits ($)*	$2,638	$2,563	$74	1.9	$1,880	$2,113	-$233	-6.0	$1,389	$1,408	-$19	-0.5
Receipt of Other Welfare Benefits												
Ever Received Welfare***	72.9	71.4	1.5	3.2	66.5	67.2	-0.7	-1.5	59.6	55.3	4.3	9.1
Total Welfare Benefits ($)*	$6,518	$6,928	-$409	-5.4	$6,150	$5,415	$735	9.7	$3,424	$4,239	-$815	-10.8
Ever Received Food Stamps***	65.9	64.5	1.4	2.9	58.7	62.5	-3.8	-7.7	50.0	48.2	1.8	3.6
Total Food Stamp Benefits ($)*	$2,447	$2,370	$77	2.8	$1,886	$2,442	-$556**	-20.4	$1,461	$1,464	-$2	-0.1
Income/Poverty												
Income Above Poverty Level***	24.8	33.8	-9.0**	-18.3	48.9	39.2	9.7*	14.7	54.6	65.7	-11.1**	-22.5
Subsequent Births												
Subsequent Birth by 24 Months after Random Assignment***	24.2	35.4	-11.2***	-24.9	23.6	31.4	-7.8	-17.4	22.4	19.3	3.1	6.9
Sample Size	**475**	**448**	**923**		**292**	**283**	**575**		**269**	**239**	**508**	

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

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TABLE E.VII.13 *(continued)*

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE E.VII.14

IMPACTS ON SERVICE RECEIPT DURING THE FIRST 28 MONTHS, BY MARITAL STATUS AND LIVING ARRANGEMENT AT ENROLLMENT

	Lived with Spouse			Lived with Other Adults			Lived Alone with Child		
	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant
Any Services									
Any Key Services***a,b	99.4	81.3	18.1***	96.4	83.0	13.4***	94.8	79.6	15.2***
Any Home Visits Or Center-Based Child Care***	96.7	50.9	45.8***	93.1	57.8	35.3***	90.5	62.2	28.3***
More Than 1 Home Visit or 2 Weeks Center-Based Child Care***	95.3	46.9	48.4***	91.9	49.5	42.4***	89.7	57.5	32.2***
Home Visits or Center Care at Required Intensity in at Least 1 Followup***	83.0	12.2	70.8***	72.1	13.5	58.7***	72.3	10.9	61.4***
Home Visits or Center Care at Required Intensity in All 3 Followups***	37.1	2.9	34.2***	26.4	1.7	24.7***	28.6	2.0	26.6***
Home Visits									
Any Home Visits***	94.6	26.9	67.7***	87.2	38.8	48.4***	84.1	33.7	50.4***
Any Child Development Services During Home Visits***	93.4	24.1	69.3***	86.0	35.8	50.2***	82.9	30.0	52.9***
Weekly Home Visits, 1st Follow-Up Period***	57.9	1.3	56.6***	48.3	6.3	42.0***	40.9	2.8	38.1***
Weekly Home Visits, 2nd Follow-Up Period***	51.8	2.2	49.7***	36.7	3.2	33.5***	32.9	2.6	30.2***
Weekly Home Visits, 3rd Follow-Up Period***	42.1	1.5	40.6***	29.0	3.0	26.0***	25.0	3.5	21.5***
Weekly Home Visits in At Least 1 Followup***	72.4	4.4	67.9***	58.6	8.6	50.0***	51.4	5.7	45.6***
Weekly Home Visits in All 3 Followups***	30.4	0.0	30.8***	19.2	1.0	18.2***	17.2	1.1	16.1***
Child Care									
Any Child Care***	72.1	66.5	5.7	88.7	82.5	6.2**	89.8	84.8	5.0*
Any Center-Based Child Care***	34.7	31.5	3.1	51.1	30.6	20.5***	52.0	40.6	11.5***
Average Hours Per Week of Center-Based Care	3.2	2.2	1.0	4.8	2.2	2.6***	5.9	3.1	2.8***
Concurrent Child Care Arrangements***	38.0	39.4	-1.4	59.2	44.8	14.4***	49.9	47.6	2.3
Average Weekly Out-of-Pocket Cost of Care	$5.68	$5.32	$0.36	$3.71	$5.87	-$2.16*	$5.73	$7.34	-$1.60
Received a Child Care Subsidy***	11.6	16.9	-5.4	29.1	34.7	-5.7	48.3	44.7	3.6
Child Was in Care at 12 Months of Age***	46.5	39.0	7.5	71.4	60.1	11.3***	72.2	59.8	12.5***
Child Was in Care at 24 Months of Age***	46.2	37.2	8.9	73.4	59.1	14.4***	66.1	53.7	12.4***
Case Management									
Any Case Management Meetings***	91.5	52.1	39.5***	86.2	62.5	23.7***	83.1	55.7	27.5***
Weekly Case Management, 1st Follow-Up Period***	53.8	5.7	48.1***	46.6	12.4	34.2***	41.2	10.8	30.4***
Weekly Case Management, 2nd Follow-Up Period***	47.1	4.2	42.9***	33.0	6.9	26.2***	31.7	5.2	26.6***
Weekly Case Management, 3rd Follow-Up Period***	41.0	4.1	36.9***	31.0	5.3	25.7***	23.9	6.2	17.8***

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TABLE E.VII.14 *(continued)*

	Lived with Spouse			Lived with Other Adults			Lived Alone with Child		
	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant	Program Group	Control Group	Impact Estimate per Eligible Applicant
Group Activities									
Any Group Parenting Activities***	78.5	45.8	32.8***	67.7	39.3	28.4***	68.7	29.1	39.6***
Any Parent-Child Group Activities***	54.2	18.5	35.7***	37.4	14.2	23.2***	36.6	11.2	25.4***
Early Intervention Services									
Identification of Child's Disability***	11.8	4.3	7.5***	5.9	5.4	0.5	5.3	6.3	-1.0
Services for Child With Disability***	6.4	3.7	2.6	3.2	3.1	0.1	3.3	3.7	-0.4
Child Health Services									
Any Child Health Services***	100.0	100.0	0.0	100.0	99.8	0.3	100.0	99.8	0.2
Any Doctor Visits***	99.8	98.9	0.9	98.6	98.2	0.5	99.7	98.7	0.9
Any Emergency Room Visits***	53.1	46.6	6.5	57.2	52.5	4.7	54.9	57.8	-2.9
Number of Emergency Room Visits for Injuries	0.2	0.3	-0.0	0.2	0.3	-0.1	0.3	0.3	-0.1
Any Dentist Visits***	34.6	25.3	9.3*	25.3	24.7	0.6	28.0	30.3	-2.3
Any Screening Tests***	61.3	57.7	3.6	66.4	67.0	-0.6	70.9	73.2	-2.3
Any Immunizations***	100.0	96.8	3.6***	98.7	98.3	0.4	98.3	99.0	-0.7
Family Development Services									
Any Education-Related Services***	84.7	49.7	35.0***	89.9	63.0	26.9***	84.1	57.8	26.3***
Any Employment-Related Services***	75.8	29.3	46.5***	76.7	50.5	26.3***	84.5	66.3	16.2***
Any Family Health Services[c]	100.0	100.0	0.0	100.0	100.0	0.0	100.0	100.0	0.0
Any Family Mental Health Services***	22.3	20.7	1.6	22.7	22.9	-0.2	26.4	25.8	0.6
Transportation Assistance***	27.0	15.7	11.3***	34.3	26.0	8.3**	37.9	25.6	12.4***
Housing Assistance***	45.5	45.7	-0.2	55.7	52.3	3.4	62.5	62.4	0.1
Sample Size	**276**	**270**	**546**	**414**	**406**	**820**	**386**	**329**	**715**

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroups are included in the estimates for each subgroup.

[a] Home visits, case management, center-based child care, and/or group parenting activities.

[b] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups in the first two columns. The third column is a subset of the second column and is included to aid interpretation of subgroup differences.

[c] There is no variance across subgroups due to lack of variance in level of services.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

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TABLE E.VII.15

IMPACTS ON CHILD AND FAMILY OUTCOMES AT AGE 3, BY MARITAL STATUS AND
LIVING ARRANGEMENT AT ENROLLMENT

	Lived with Spouse				Lived with Other Adults				Lived Alone with Child			
Outcome	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c
Child Cognitive and Language Development												
Bayley Mental Development Index (MDI) Standard Score	94.5	93.1	1.3	10.3	90.6	87.5	3.1***	24.1	91.9	90.6	1.3	10.4
Percentage with MDI < 85***^{d}	19.1	26.9	-7.8	-16.7	28.0	37.3	-9.3**	-19.9	27.8	29.5	-1.7	-3.6
Peabody Picture Vocabulary Test (PPVT)-III Standard Score	86.6	88.0	-1.4	-8.8	81.6	79.9	1.8	11.0	86.7	85.2	1.5	9.0
Percentage with PPVT-III < 85***	37.2	43.4	-6.2	-12.5	55.9	62.0	-6.1	-12.3	41.4	44.9	-3.4	-6.9
Child Social-Emotional Development-1.4												
Engagement of Parent During Parent-Child Semistructured Play	4.8	4.6	0.2	14.1	4.9	4.5	0.4***	34.4	4.8	4.7	0.1	4.5
Sustained Attention with Objects During Parent-Child Semistructured Play**	4.9	4.9	-0.0	-1.1	5.1	4.8	0.4***	35.2	4.9	4.8	0.1	5.0
Engagement of Parent During Parent-Child Puzzle Challenge Task	5.1	5.1	-0.0	-0.2	5.0	4.9	0.1	13.9	4.9	4.9	0.1	5.5
Persistence During Parent-Child Puzzle Challenge Task	4.7	4.7	0.0	0.2	4.4	4.4	0.0	0.8	4.6	4.5	0.1	8.3
Bayley Behavioral Rating Scale (BRS): Emotional Regulation	4.0	4.0	-0.0	-0.5	3.9	3.9	-0.0	-1.4	4.0	3.9	0.1	6.6
Bayley BRS: Orientation/ Engagement	3.8	3.7	0.1	11.3	3.9	3.9	0.0	5.0	3.8	3.8	-0.0	-4.4
Negativity Toward Parent During Parent-Child Semistructured Play	1.3	1.2	0.0	4.7	1.3	1.4	-0.1*	-18.1	1.3	1.4	-0.1	-18.4
Frustration During Parent-Child Puzzle Challenge Task	3.1	2.8	0.3	22.2	2.6	2.8	-0.1	-10.6	2.7	2.7	0.1	4.3

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TABLE E.VII.15 *(continued)*

	Lived with Spouse				Lived with Other Adults				Lived Alone with Child			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Child Behavior Checklist—Aggressive Behavior	10.7	11.1	-0.4	-6.3	10.8	12.1	-1.3**	-20.1	10.8	11.5	-0.7	-11.4
Child Health Status												
Child's Health Status	4.0	4.0	0.0	2.1	4.0	4.0	-0.0	-4.1	4.0	4.0	0.0	0.5
Percentage of Children in Fair or Poor Health***	8.2	8.5	-0.3	-1.1	7.6	9.5	-1.8	-6.4	10.0	8.7	1.3	4.6
Quality of the Home Environment and Parenting: Overall and Physical Environment												
Home Observation for Measurement of the Environment (HOME) Total Score	28.1	27.8	0.3	6.1	26.7	26.0	0.6	12.3	27.8	27.2	0.6	12.4
HOME Internal Physical Environment	7.9	8.0	-0.1	-3.6	7.5	7.6	-0.1	-7.8	7.9	7.9	-0.0	-2.3
Parenting Behavior: Emotional Support												
HOME Warmth	2.7	2.7	0.1	7.8	2.4	2.3	0.1	12.1	2.6	2.6	0.1	6.2
Supportiveness During Parent-Child Semistructured Play	4.0	4.0	0.0	2.3	3.9	3.7	0.2*	16.5	4.1	4.0	0.1	10.8
Supportive Presence During Parent-Child Puzzle Challenge Task	4.7	4.7	-0.1	-4.2	4.3	4.1	0.2	11.8	4.6	4.7	-0.1	-6.3
Parenting Behavior: Stimulation of Language and Learning												
Percentage of Children with a Regular Bedtime***	59.9	60.5	-0.6	-1.2	56.5	55.8	0.7	1.5	58.9	58.6	0.2	0.5
Percentage of Children Who Follow a Bedtime Routine***	75.5	72.7	2.9	6.2	65.0	67.9*	-2.8	-6.1	71.0	68.1	2.9	6.3
HOME: Support of Language and Learning	10.6	10.6	0.0	2.0	10.4	10.2	0.2	11.1	10.7	10.6	0.2	7.3
Parent-Child Play	4.4	4.2	0.2*	19.4	4.4	4.4	0.0	3.9	4.4	4.4	0.0	3.1
Quality of Assistance During Parent-Child Puzzle Challenge Task	3.9	3.7	0.2	12.7	3.6	3.3	0.3**	21.3	3.7	3.5	0.1	11.9

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TABLE E.VII.15 (*continued*)

	Lived with Spouse				Lived with Other Adults				Lived Alone with Child			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Percentage of Parents Who Read to Child Daily***	62.8	48.5	14.3***	28.7	55.3	51.9	3.3	6.7	56.2	53.8	2.4	4.7
Percentage of Parents Who Read to Child at Bedtime***	37.1	35.2	1.9	4.1	27.9	26.5	1.4	3.0	34.7	30.9	3.8	8.4
Parenting Behavior: Negative Parenting Behavior												
Detachment During Parent-Child Semistructured Play	1.2	1.2	-0.1	-7.3	1.3	1.3	-0.0	-0.6	1.2	1.3	-0.1	-11.0
Intrusiveness During Parent-Child Semistructured Play	1.6	1.5	0.1	15.3	1.7	1.8	-0.1	-13.9	1.5	1.6	-0.0	-2.9
Detachment During Parent-Child Puzzle Challenge Task	1.5	1.4	0.1	7.1	1.8	1.8	-0.1	-6.8	1.6	1.5	0.0	1.4
Intrusiveness During Parent-Child Puzzle Challenge Task	2.4	2.4	0.0	1.0	2.9	3.0	-0.1	-8.2	2.6	2.6	-0.1	-5.6
Negative Regard During Parent-Child Semistructured Play	1.2	1.2	0.1	8.0	1.4	1.3	0.0	4.8	1.3	1.4	-0.1	-19.8
HOME Harshness	0.1	0.2	-0.1	-9.0	0.4	0.4	-0.0	-1.0	0.3	0.3	6.0	0.1
Percentage of Parents Who Spanked Child in the Past Week***	38.6	45.8	-7.2	-14.4	48.6	57.8	-9.2**	-18.4	43.1	50.3	-7.3	-14.5
Knowledge of Safety Practices and Discipline Strategies												
Percentage of Parents Who Usually Use a Car Seat Correctly***	77.8	74.4	3.4	7.4	63.6	66.2	-2.6	-5.7	69.9	71.0	-1.1	-2.4
Percentage of Parents Suggesting Physical Punishment as a Discipline Strategy***	28.9	33.6	-4.7	-9.4	49.7	56.2	-6.5*	-13.0	44.3	53.5	-9.2**	-18.5
Percentage of Parents Who Would Use Mild Discipline Only***	57.6	53.3	4.3	8.8	43.8	37.6	6.3*	-12.7	47.3	37.8	9.5**	1.3

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TABLE E.VII.15 (*continued*)

	Lived with Spouse				Lived with Other Adults				Lived Alone with Child			
Outcome	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c
Index of Severity of Discipline Strategies	2.8	3.0	-0.2	-13.5	3.5	3.7	-0.2*	-12.3	3.2	3.6	-0.4***	-23.7
Parent Physical and Mental Health												
Parent's Health Status	3.4	3.5	-0.1	-12.7	3.4	3.5	-0.1	-4.5	3.3	3.4	-0.1	-14.1
Parenting Stress Index (PSI) Parental Distress	25.3	25.2	0.0	0.2	25.1	25.7	-0.6	-6.7	24.4	26.4	-2.0**	-20.4
PSI Parent-Child Dysfunctional Interaction	18.6	17.5	1.2	18.9	17.9	18.1	-0.2	-2.9	17.7	17.8	-0.2	-2.6
Center for Epidemiological Studies Depression (CES-D; Short Form)	6.8	6.8	0.1	0.8	8.4	8.6	-0.3	-3.8	7.6	7.9	-0.3	-4.6
CES-D Severe Depressive Symptoms ***	10.3	13.0	-2.7	-7.4	19.5	16.6	2.9	8.2	13.7	17.8	-4.0	-11.2
Family Environment Scale (FES): Family Conflict	1.6	1.6	-0.0	-3.2	1.7	1.7	0.0	1.1	1.6	1.7	-0.1	-11.8
Father Presence												
Currently Married To Biological Father ***	83.7	86.4	-2.7	-5.6	20.0	20.1	-0.1	-0.3	17.4	15.2	2.2	4.5
Biological Father is Currently Married to, Lives with, or is Boyfriend of Respondent***	84.0	88.1	-4.1	-8.2	44.3	43.7	0.5	1.1	29.4	29.3	0.2	0.3
Biological Father Currently Present in Child's Life***	92.1	97.0	-4.9*	-10.8	69.9	66.4	3.5	7.7	57.6	53.8	3.8	8.6
Continuous Biological Father Presence Child Age 14-36 Months***	93.6	97.1	-3.5	-7.6	58.0	60.9	-2.9	-6.3	48.1	44.7	3.4	7.3
No Biological Father Presence Child Age 14-36 Months***	0.6	-0.1	0.7	2.2	16.6	17.9	-1.3	-4.3	20.3	20.7	-0.4	-1.1

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TABLE E.VII.15 *(continued)*

	Lived with Spouse				Lived with Other Adults				Lived Alone with Child			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Continuous Male Presence Child Age 14-36 Months***	93.4	98.6	-5.2**	-14.6	76.0	81.3	-5.3	-14.9	69.4	78.2	-8.8	-24.6
No Male Presence Child Age 14-36 Months***	0.0	0.0	0.0	0.0	1.8	2.0	-0.2	-1.9	3.8	4.1	-0.2	-1.9
Sample Size												
Bayley	213	203	416		354	305	659		312	268	580	
Parent Interview	288	269	557		425	388	813		394	341	735	
Parent-Child Interactions	221	213	434		356	313	669		297	255	552	

SOURCE: Parent interviews, child assessments, interviewer observations, and assessments of semistructured parent-child interactions conducted when children were approximately 36 months old.

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

TABLE E.VII.16

IMPACTS ON SELF-SUFFICIENCY AT 28 MONTHS, BY MARITAL STATUS AND LIVING ARRANGEMENT AT ENROLLMENT

	Lived with Spouse				Lived with Other Adults				Lived Alone with Child			
Outcome	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]	Program Group Participants	Control Group[a]	Impact Estimate per Participant[b]	Effect Size[c]
Education/Job Training												
Ever in Education or Training***[d]	45.3	41.9	3.4	6.8	66.3	58.6	7.7**	15.4	58.0	47.1	10.9**	21.7
Ever in High School***	1.0	0.9	0.1	0.5	22.7	17.5	5.2*	18.1	8.9	4.5	4.4*	15.4
Ever in ESL Class***	7.7	3.4	4.3*	30.4	2.3	0.6	1.7*	12.0	2.7	4.4	-1.7	-11.7
Ever in Vocational Program***	9.9	13.8	-3.9	-10.3	21.8	20.4	1.4	3.8	19.2	14.8	4.4	11.7
Average Hours per Week in Education or Training	1.6	1.3	0.3	4.9	6.5	4.7	1.8***	28.2	3.9	3.1	0.8	11.8
In Education or Training:												
1st Quarter***	8.5	12.1	-3.6	-8.7	27.3	24.9	2.4	5.7	20.4	20.1	0.3	0.7
2nd Quarter***	13.1	14.7	-1.6	-3.6	34.1	28.0	6.1*	14.2	23.0	24.0	-1.0	-2.3
3rd Quarter***	15.6	14.1	1.5	3.4	38.7	29.3	9.4***	21.3	29.8	28.4	1.4	3.3
4th Quarter***	14.6	13.5	1.2	2.6	38.1	25.2	12.9***	30.1	29.7	27.4	2.3	5.4
5th Quarter***	12.5	14.0	-1.5	-3.4	37.8	27.4	10.4***	24.2	29.7	27.9	1.8	4.3
6th Quarter***	16.1	12.6	3.6	8.5	37.5	30.3	7.3*	17.5	28.1	21.9	6.2	14.9
7th Quarter***	15.1	12.2	2.9	7.2	32.2	26.8	5.4	13.5	25.3	18.3	6.9*	17.3
8th Quarter***	18.6	9.4	9.2**	23.5	31.2	24.6	6.6*	16.8	24.4	18.0	6.5	16.5
Have High School Diploma***	53.7	56.2	-2.5	-4.9	44.7	43.1	1.6	3.2	50.4	49.1	1.3	2.6
Have GED***	6.9	4.4	2.5	7.8	14.7	14.3	0.4	1.3	8.9	13.5	-4.6	-14.5
Employment												
Ever Employed***	81.1	77.5	3.6	9.6	87.4	87.1	0.3	0.9	86.5	83.9	2.6	7.0
Average Hours/Week Employed	16.5	16.8	-0.4	-2.6	17.1	15.7	1.3	9.1	17.4	18.0	-0.6	-4.4
Employed in:												
1st Quarter***	42.1	35.1	7.0	14.4	32.6	36.1	-3.5	-7.2	45.5	44.4	1.2	2.4
2nd Quarter***	45.2	40.6	4.6	9.3	43.1	44.4	-1.2	-2.5	49.6	47.5	2.0	4.1
3rd Quarter***	55.6	50.1	5.5	11.0	52.9	54.4	-1.5	-3.0	52.2	51.8	0.4	0.8
4th Quarter***	59.5	52.9	6.5	13.1	54.9	57.6	-2.8	-5.6	56.1	53.6	2.5	4.9
5th Quarter***	62.7	57.4	5.3	10.8	60.4	60.9	-0.6	-1.1	62.8	61.2	1.6	3.3
6th Quarter***	61.1	57.2	3.9	7.9	65.6	58.7	6.9	14.0	64.9	63.4	1.6	3.2
7th Quarter***	60.0	54.3	5.7	11.4	59.9	57.2	2.7	5.5	60.9	60.1	0.8	1.5
8th Quarter***	61.8	56.4	5.4	11.0	64.4	61.3	3.0	6.2	63.6	63.2	0.4	0.8
Any Self-Sufficiency-Oriented Activity (Education, Training or Employment)												
Ever Employed or in Education/Training***	89.6	85.8	3.7	12.3	94.6	94.1	0.4	1.4	93.1	89.8	3.2	10.7
Average Hours per Week in Any Activity	18.5	18.7	-0.3	-1.6	24.3	20.6	3.6***	23.1	21.9	21.6	0.4	2.3

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TABLE E.VII.16 (*continued*)

	Lived with Spouse				Lived with Other Adults				Lived Alone with Child			
Outcome	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c	Program Group Participants	Control Group^a	Impact Estimate per Participant^b	Effect Size^c
In Activities in:												
1st Quarter***	46.2	41.1	5.1	10.3	50.1	54.3	-4.2	-8.4	59.1	55.8	3.3	6.6
2nd Quarter***	52.3	46.9	5.4	11.0	62.6	62.4	0.2	0.3	65.0	59.3	5.6	11.4
3rd Quarter***	62.8	57.7	5.1	10.7	71.9	70.6	1.4	2.8	70.6	66.4	4.2	8.9
4th Quarter***	65.2	58.3	6.9	14.4	73.5	70.1	3.4	7.1	71.9	66.3	5.6	11.8
5th Quarter***	66.0	61.3	4.6	10.0	77.4	73.0	4.5	9.6	73.6	73.0	0.6	1.2
6th Quarter***	67.5	61.4	6.1	13.0	80.8	72.6	8.2**	17.5	76.9	71.2	5.7	12.2
7th Quarter***	64.3	58.9	5.4	11.2	74.9	70.3	4.7	9.7	71.8	65.9	5.9	12.3
8th Quarter***	68.0	59.2	8.8*	18.8	76.3	72.9	3.3	7.1	74.7	69.0	5.7	12.2
AFDC/TANF Receipt												
Ever Received AFDC/TANF***	20.7	20.0	0.7	1.4	51.0	50.4	0.6	1.2	59.9	58.8	1.2	2.4
Received AFDC/TANF in:												
1st Quarter***	13.5	10.3	3.1	6.7	35.4	33.1	2.3	4.8	46.3	46.0	0.4	0.8
2nd Quarter***	14.4	12.1	2.3	4.8	36.3	35.2	1.1	2.3	46.6	47.9	-1.4	-2.8
3rd Quarter***	14.6	14.4	0.3	0.6	39.5	38.3	1.2	2.6	49.3	49.3	0.0	-0.1
4th Quarter***	8.4	10.3	-2.0	-4.2	31.3	32.7	-1.4	-3.0	45.2	43.6	1.6	3.5
5th Quarter***	8.2	8.6	-0.4	-0.8	30.8	30.8	0.0	-0.1	42.7	46.3	-3.6	-7.9
6th Quarter***	9.5	10.9	-1.4	-3.1	29.5	32.5	-3.0	-6.6	43.9	46.3	-2.4	-5.2
7th Quarter***	6.9	8.1	-1.3	-2.8	20.6	29.6	-8.9**	-20.3	35.0	38.8	-3.8	-8.6
8th Quarter***	6.3	4.2	2.1	5.0	19.9	28.2	-8.3**	-19.6	35.1	32.0	3.1	7.3
Total AFDC/TANF Benefits ($)*	$822	$571	$251	6.5	$2,163	$2,433	-$270	-7.0	$3,579	$3,602	-$22	-0.6
Receipt of Other Welfare Benefits												
Ever Received Welfare***	46.1	42.8	3.4	7.2	72.6	70.6	2.0	4.3	77.1	76.9	0.2	0.4
Total Welfare Benefits ($)*	$1,928	$1,630	$298	3.9	$6,319	$6,440	-$121	-1.6	$7,396	$8,153	-$757	-10.0
Ever Received Food Stamps***	40.2	38.7	1.5	3.1	64.0	62.3	1.7	3.6	70.0	71.2	-1.2	-2.5
Total Food Stamp Benefits ($)	$1,126	$752	$374	13.7	$2,262	$2,259	$3.3	0.1	$2,794	$2,858	-$64	-2.3
Income/Poverty												
Income Above Poverty Level***	54.1	57.1	-3.1	-6.2	38.1	41.0	-2.9	-5.9	33.4	37.0	-3.6	-7.4
Subsequent Births												
Subsequent Birth by 24 Months after Random Assignment***	22.2	27.1	-5.0	-11.1	26.5	31.5	-5.0	-11.1	17.2	27.7	-10.5**	-23.3
Sample Size	**276**	**270**	**546**		**414**	**406**	**820**		**386**	**529**	**715**	

SOURCE: Parent Services Follow-Up Interviews completed an average of 7, 16, and 28 months after random assignment.

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TABLE E.VII.16 (*continued*)

NOTE: All estimates were calculated using regression models, where each site was weighted equally. Only sites with at least 10 program group members and 10 control group members in the subgroup are included in the estimates for each subgroup.

[a] A participant is defined as a program group member who received more than one Early Head Start home visit, met with an Early Head Start case manager more than once, received at least two weeks of Early Head Start center-based care, and/or participated in Early Head Start group parent-child activities. The control group mean is the mean for the control group members who would have participated in Early Head Start if they had instead been assigned to the program group. This unobserved mean is estimated as the difference between the program group mean for participants and the impact per participant.

[b] The estimated impact per participant is measured as the estimated impact per eligible applicant divided by the proportion of program group members who participated in Early Head Start services (which varied by site). The estimated impact per eligible applicant is measured as the difference between the regression-adjusted means for program and control group members.

[c] The effect size is calculated by dividing the estimated impact per participant by the standard deviation of the outcome measure for the control group times 100 (that is, it is the impact per participant expressed as a percentage of a standard deviation).

[d] Asterisks next to variable names indicate significance levels for statistical tests of differences in impacts across the subgroups.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

EARLY HEAD START®

RESEARCH

Making a Difference in the Lives of Infants and Toddlers and Their Families: The Impacts of Early Head Start

Volume III: Local Contributions to Understanding the Programs and Their Impacts

U.S. Department of Health and Human Services
Administration for Children and Families
Office of Planning, Research and Evaluation
Child Outcomes Research and Evaluation
Administration on Children, Youth and Families
Head Start Bureau

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Early Head Start
Research and Evaluation Project
Local—National Partnerships

Making a Difference in the Lives of Infants and Toddlers and Their Families: The Impacts of Early Head Start

Volume III: Local Contributions to Understanding the Programs and Their Impacts

Final Report: June 2002

Child Outcomes Research and Evaluation
Office of Planning, Research, and Evaluation
Administration for Children and Families
And the Head Start Bureau
Administration on Children, Youth and Families
Department of Health and Human Services

Early Head Start Evaluation Reports

Leading the Way: *Describes the characteristics and implementation levels of 17 Early Head Start programs in fall 1997, soon after they began serving families.*

Executive Summary (December 2000): *Summarizes Volumes I, II, and III.*

Volume I (December 1999): *Cross-Site Perspectives—Describes the characteristics of Early Head Start research programs in fall 1997, across 17 sites.*

Volume II (December 1999): *Program Profiles—Presents the stories of each of the Early Head Start research programs.*

Volume III (December 2000): *Program Implementation—Describes and analyzes the extent to which the programs fully implemented, as specified in the Revised Head Start Program Performance Standards, as of fall 1997.*

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Building Their Futures: How Early Head Start Programs Are Enhancing the Lives of Infants and Toddlers in Low-Income Families: *Presents analysis of the impacts that the research programs have had on children's development, parenting, and family development through 2 years of age.*

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Technical Report (June 2001): *Detailed findings and report on methodology and analytic approaches.*

Special Policy Report on Child Care in Early Head Start (summer 2002): *Describes the nature, types, and quality of child care arrangements in which Early Head Start and control group children enrolled, and presents implications for public policy.*

Special Policy Report on Children's Health in Early Head Start (summer 2002): *Describes health services received by Early Head Start and control group families.*

Making a Difference in the Lives of Infants and Toddlers and Their Families: The Impacts of Early Head Start (June 2002): *Presents analysis of the impacts that the research programs have had on children's development, parenting, and family development through the children's third birthday (including two to three years of program participation).*

Reports Are Available at:

http://www.acf.dhhs.gov/programs/core/ongoing_research/ehs/ehs_intro.html

http://www.mathematica-mpr.com/3rdLevel/ehstoc.htm

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The Early Head Start Research Consortium

PREFACE

The Early Head Start Research Consortium comprises individuals from the 17 programs participating in the evaluation, 15 university research teams funded by ACYF to work with 16 of the research programs, ACYF's Head Start Bureau, ACF's Child Outcomes Research and Evaluation (CORE) team, and the national team of Mathematica Policy Research, Inc. and Columbia University's Center for Children and Families, Teachers College.

In addition to participating in many national evaluation activities (including collecting cross-site data and participating collaboratively throughout the study), each local research team also conducted site-specific local research. These research projects were designed to augment the national study. In general, they focused on in-depth research on understanding the local context and the role of mediators and moderators in child outcomes. Their research often encompassed measures that augmented those used in the national, cross-site data collection. The local Early Head Start program staff helped with all phases of the study, from random assignment and locating families for data collection to participation in discussions of analysis and reporting. Local research teams and their program partners have been analyzing data and presenting at state, national, and international conferences and meetings and publishing descriptive findings in peer review journals since early in the project.

This appendix presents brief write-ups of 21 studies from 9 of the local research teams and from staff in 2 of the programs. The Consortium established a peer-review process, which resulted in contributions reflecting a variety of perspectives. Each of these brief papers expands on the synopses included as boxes in Volume I of this report. They appear alphabetically, by first author.

CONTENTS

Preface v

Atwater, Jane, Judith Carta, Jean Ann Summers, and Martha Staker. "Parent Responsiveness and Children Developmental Outcomes" 1

Ayoub, Catherine, and Barbara Alexander Pan. "Early Head Start Impacts on Parental Stress and Harsh Parenting Attitudes Among Rural Families" 15

Baumwell, Lisa, Tonia Cristofaro, and Mark Spellmann. "Mother's Socialization of Toddler Conflict Resolution" 23

Farber, Michaela, Elizabeth M. Timberlake, Shavaun M. Wall, and Nancy E. Taylor. "Early Head Start Intervention with Families and Families' Investment in Children" 35

Ipsa, Jean M., and Elizabeth A. Sharp. "Andreya Earns Her High School Degree: The Role of Early Head Start" 55

Korfmacher, Jon, and Paul Spicer. "The Child's Experience in a Montessori Early Head Start Program" 69

Lee, Seung-yeon, Sharon Hoerr, Rachel Schiffman, and Hiram Fitzgerald. "Beverage, Fruit and Vegetable Intakes by Early Head Start-Eligible Mothers and Their Children" 87

McKelvey, Lorraine M., Laurie A. Van Egeren, Rachel F. Schiffman, Hiram Fitzgerald, Thomas Reischl, and Mary Cunningham-Deluca. "Coping Strategies of Low-Income Mothers: Stability and Change Over Three Years" 93

Pan, Barbara Alexander, Meredith Rowe, Elizabeth Spier, Catherine S. Tamis-LeMonda, and Mark Spellmann. "Validation of National Child Language Measures at 14 and 24 Months" 101

Roberts, Joanne, Catherine S. Tamis-LeMonda, and Mark Spellmann. "Functions of Language Use in Mother-Toddler Communication" 107

Robinson, JoAnn, Sheridan Green, Nancy Song, Robert Emde, John Korfmacher, and Rebecca Soden. "Predicting Early Head Start Program Use and Acceptance by Parents" 115

Roggman, Lori A., Lisa K. Boyce, Gina A. Cook, and Andrea D. Hart. "How Much Better Than Expected? Improving Cognitive Outcomes in Utah's Bear River Early Head Start" 127

837

Shannon, Jacqueline D., Catherine S. Tamis-LeMonda, Joanne Joseph, Bonnie Hannibal, Tracy Poon, Michele Pelnar and Vanessa Rodriquez. "Father-Child Interactions: Measuring Past Paternal Influences" 139

Sharp, Elizabeth A., Jean Ipsa, Kathy R. Thornburg, and Valerie Lane. "Relations Among Mother and Home Visitor Personality Traits, Relationship Quality, and Amount of Time Spent in Home Visits" 155

Spellmann, Mark, Catherine Tamis-LeMonda, Maria Yarolin, Lisa Baumwell, Joanne Roberts, and the NYU Early Childhood Research Team. "Predictors and Outcomes of Program Participation, and Correlates of Children's Cognitive Development at the Educational Alliance's Early Head Start" 171

Mark Spellmann. "A Noteworthy Pattern of Early Head Start Participation: Enrollment==> Withdrawal => Resumption" 193

Spier, Elizabeth, Catherine S. Tamis-LeMonda, Mark Spellmann, Barbara Alexander Pan, and Meredith Rowe. "Mother-Child Language at 14 and 24 Months: Concurrent and Lagged Associations" 197

Stowitschek, Joseph J., and Eduardo J. Armijo. "Parents' Perception of Training and Service Activities Regarding Their Child Nurturing and Development: Implementation and Benefits of Early Head Start" 205

Tamis-LeMonda, Catherine S., Elizabeth Spier, and Mark Spellmann. "Relations Between Specific and Global Features of Mother-Child Interactions and Language" 219

Van Egeren, Laurie A., Lorraine McKelvey, Hiram E. Fitzgerald, Rachel F. Schiffman, Mary Cunningham-DeLuca, and Shelley M. Hawver. "Change in Parent-Child Interaction in Low-Income Families: Links to Father Status" 227

Wall, Shavaun M., Nancy E. Taylor, Harriet Liebow, Christine A. Sabatino, Michaela Z. Farber, and Elizabeth M. Timberlake. "Early Head Start Supports Families in Obtaining Services for Young Children With Disabilities" 235

PARENT RESPONSIVENESS AND CHILDREN'S DEVELOPMENTAL OUTCOMES

Jane Atwater, Judith Carta, Jean Ann Summers, And Martha Staker
University of Kansas

One of the primary goals of Early Head Start (EHS) is to support parents in fostering their children's development. EHS programs attempt to engage families in a variety of experiences to help them learn how to interact with their children in ways that will stimulate language and cognitive development and that will provide emotional support. Compared to children whose parents face fewer challenges, children from families with multiple risks – such as substance abuse, poverty, and limited education – are more likely to experience negative interactions and non-responsive parenting (Booth, Barnard, Mitchell & Spieker, 1987; Kelly, Morriset, Barnard, Hammond & Booth, 1996). Because they miss out on critically important opportunities to interact with their parents, the children in these families often have slower rates of cognitive and language development in the early years and, thus, often begin school at a disadvantage (Beckwith, 1971; Downey & Coyne, 1990; Furstenberg, Brooks-Gunn & Chase-Lansdale, 1989).

Project EAGLE, an EHS program in Kansas City, Kansas, has identified responsive parent-child interaction as an optimal and essential context for promoting children's development and for fostering families' well being. The present analyses were designed to support this program focus by examining parent responsiveness (close involvement and verbal response) as a predictor of early development for children in multi-risk families. In addition, for EHS families, we asked whether the level of engagement in home-based services, which were designed to enhance parent-child relationships, would be related to the level of parents' responsiveness with their children and to children's developmental progress.

Method

Participants

The analysis sample includes 74 families randomly assigned to the EHS Program Group and 79 control families. All families in the Program Group were offered home-based EHS services; and, for families with child care needs, the EHS program also provided placement in developmentally appropriate, community-based child care. Comparison families were free to access community services other than those provided by Project EAGLE. A stratified random sample was selected to represent the ethnic diversity of the community: 59 percent African American, 20 percent European American, and 20 percent Hispanic/Latino. When the focus children were born, maternal age ranged from 12 to 39 years (mean = 21.8).

Measures

Parent responsiveness. Parent responsiveness was assessed during 1-hour home-based observations scheduled to occur when children were 8, 14, 18, 24, 30 and 36 months of age, with actual ages ranging from 7 to 42 months. Data were collected during typical, unstructured home activities using the Code for Interactive Recording of Children's Learning Environments (CIRCLE) (Atwater, Montagna, Creighton, Williams & Hou, 1993). The CIRCLE system is a computer-based direct observation instrument that provides a sequential record of parent and child behaviors, as well as the context of their interactions, and includes 90 specific behavior and context codes. Inter-observer agreement, assessed during six percent of observations, averaged 91.1 percent across all CIRCLE codes (range = 80.7-96.30). For the specific behaviors used in these analyses, mean percentage agreement was 85.4 percent for parent involvement, 87.7 percent for parent verbal responses, and 80.2 percent for child social behavior.

For the present analyses, we identified a subset of behaviors relevant to the concept of parent responsiveness and constructed five measures to reflect different aspects of responsiveness. Each measure represents the percentage of intervals the behavior occurred during observations, averaged across all observations for a given family. First, we identified two composite measures that provide an index of the parent's general responsiveness with the child.

- Parent talk to the child–Any parent talk directed specifically to the focus child.
- Close involvement–Any time the parent is in close proximity and attending to the child.

Second, we selected three specific measures that describe qualitative features of Parent Talk and Close Involvement. These behaviors are subsets of the two general measures described above and were selected because of their relevance to supporting children's language and learning.

- Prompt/expansion of child communication–The parent (a) requests a communicative response from the child, or (b) expands or elaborates on the child's communication.
- Positive/exuberant response–The parent (a) praises, affirms, or expresses affection to the child, or (b) speaks in a warm, enthusiastic manner to engage the child.
- Shared activity–The parent is closely involved, and is also participating with the child in an activity (e.g., playing with a toy, making cookies together). The parent is a co-participant rather than simply directing the child.

Children's development. To track developmental progress, we analyzed children's cognitive and language growth over time, using hierarchical linear modeling (HLM) (Raudenbush, Bryk, Cheong & Congdon, 2000). We assessed children's cognitive development with the Bayley Scales of Infant Development. Like the observations, Bayley assessments were scheduled at 8, 14, 18, 24, 30 and 36 months of age, with actual age of administration ranging from 7 to 42 months. The measure of language development was the percentage of time focus children talked (using words or signs) to other children or adults during CIRCLE observations.

For half of the assessment periods (14, 24 and 36 months), Bayley and CIRCLE assessments were conducted during the separate home visits. At other age levels, the two assessments typically were completed during the same visit.

Family risk factors. In previous studies, family risk factors have been associated with a higher risk of developmental delay (e.g., Sameroff & Fiese, 1990). Thus, to control for the possible confound of family risk status in the present analyses, a Cumulative Risk Index was calculated for each family, composed of factors assessed at enrollment: low parent education, parent not employed or in school, single parent status, adolescent mother, large family, minority status, and limited English proficiency.

Parent engagement in the EHS program. Active engagement in EHS services was examined as a possible predictor of parents' responsiveness with their children. We hypothesized that more highly engaged parents would carry through on program goals by being more responsive during parent-child interactions outside the intervention context. The engagement summary score is a composite of ratings that represent three different aspects of families' participation in EHS services: the level and consistency of parent participation over time, active interest and involvement during home visits, and follow through on individual program goals between visits. Program staff rated parent engagement after children aged out of the EHS program at age 3.

Results and Discussion

Indicators of Family and Child Risk

Many of the families in our sample experienced multiple risk factors in addition to poverty: 57 percent of mothers had not finished high school, 59 percent were neither employed nor attending school, 14 percent were minors when their children were born, 73 percent were single parents, 13 percent had large families (more than five members), 10 percent did not speak English, and 79 percent were from minority groups that are at increased risk for limited opportunities in American society. On average, families experienced 3.1 risk factors in addition to low income (range = 0-6). Children's standard scores for cognitive development also indicate the level of risk in this sample (see Table 1). Although we found significant variation in children's cognitive development, their average scores were approximately one standard deviation below the mean and tended to decline over time.

TABLE 1
BAYLEY MENTAL DEVELOPMENT INDEX (MDI)

Child Age	N	Mean	Range
8 months	54	90.0	74 – 111
14 months	116	89.6	53 – 110
18 months	93	82.5	55 – 117
24 months	79	83.1	52 – 118
30 months	92	85.8	55 – 120
36 months	95	85.0	52 – 105

What Was the Relationship Between Parent Responsiveness and Children's Development?

To answer this question, we examined developmental trajectories for children in both the EHS Group and the Comparison Group. As a preliminary step, we first used HLM analyses to determine whether family risk status and group assignment (EHS vs. comparison) were significant predictors of the developmental measures. To control for the number of analyses conducted, results were evaluated at a .01 significance level. In contrast to expectations, risk status and group assignment were not significant predictors of children's Bayley performance or verbal communication. Thus, those variables were not included in further tests of parent responsiveness as a predictor of child outcomes.

Next, the five measures of responsiveness were examined individually as possible predictors of children's Bayley performance and verbal communication. HLM analyses revealed that every measure of verbal responsiveness (Parent Talk, Prompt/Expansion, and Positive/Exuberant

Response) was a significant predictor of Bayley outcomes (see Table 2). Figure 1 illustrates growth trajectories in cognitive development for children whose parents talked to them more often (the highest quartile for parent talk), compared to those who experienced the lowest level of parent talk (lowest quartile). Although the general measure of Close Involvement was not a significant predictor, Shared Activity was related positively to cognitive outcomes and was the only significant predictor of growth in cognitive development from 8 to 36 months.

Results for children's verbal communication were even more striking and consistent. Every measure of responsiveness was a significant predictor of both communication outcomes and increases in verbal communication from 8 to 36 months (see Table 3). Figure 2 illustrates developmental trajectories in communication for children who received the highest and lowest levels of parent talk. Thus, when parents were more verbally responsive and involved in their children's activities, children not only talked more; their use of words also increased more rapidly over time.

TABLE 2
SUMMARY OF HLM ANALYSES FOR PREDICTORS OF THE BAYLEY SCALES OF INFANT DEVELOPMENT (RAW SCORES)

		Intercept			Slope		
Predictors	df	Coefficient	T	P	Coefficient	T	P
Unconditional	50	113.20	94.302	.000	2.78	27.983	.000
Parent Talk to Child	150	0.19	3.883	.000**	-0.002	-0.405	-
Unconditional	150	113.45	73.280	.000	2.65	21.598	.000
Close Involvement	150	0.09	2.515	.012	0.003	0.956	-
Unconditional	150	115.37	177.450	.000	2.83	48.992	.000
Prompt/Expansion	150	0.46	4.117	.000**	-0.02	-1.803	-
Unconditional	150	115.92	193.826	.000	2.70	55.431	.000
Positive/Exuberant Response	150	0.87	3.703	.000**	0.04	2.352	.019
Unconditional	150	116.68	222.025	.000	2.72	66.061	.000
Shared Activity	150	0.42	2.799	.006*	0.04	3.933	.000**

Note: The unconditional model is the Level 1 HLM model without predictor variables. The intercept represents developmental level at the midpoint of the age range (23.5 months). The slope represents developmental change per month. Significance levels of .05 or better are listed in the table; asterisks indicate those Level 2 predictors that meet the .01 standard.

* p < .01
**p<.001

FIGURE 1
MODELED GROWTH TRAJECTORIES FOR COGNITIVE DEVELOPMENT ACROSS LEVELS OF PARENT TALK

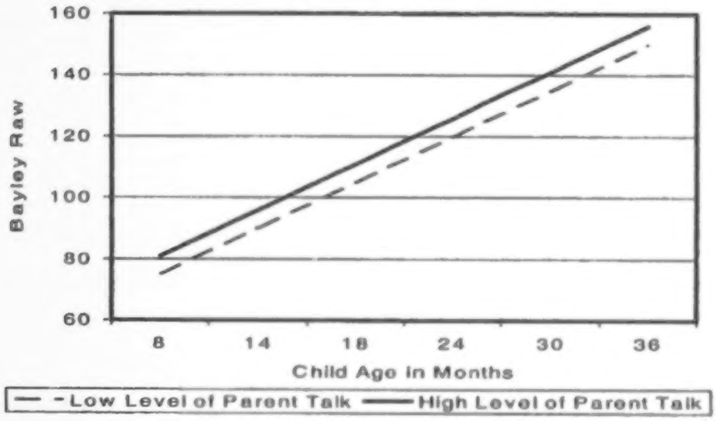


TABLE 3

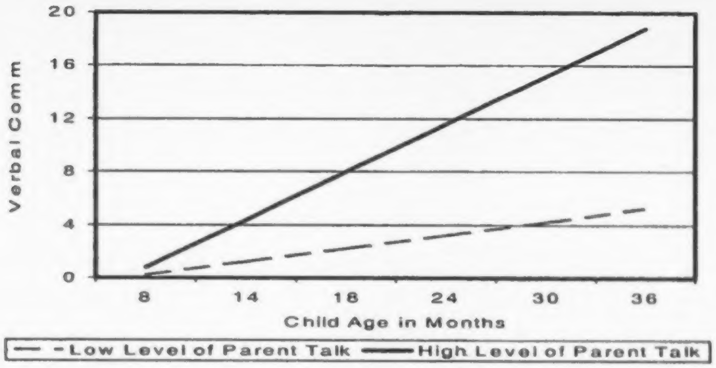
SUMMARY OF HLM ANALYSES FOR PREDICTORS OF CHILDREN'S VERBAL COMMUNICATION DURING TYPICAL HOME ACTIVITIES

Predictors	df	Intercept			Slope		
		Coefficient	T	P	Coefficient	T	P
Unconditional	151	0.42	0.616	-	0.04	0.587	-
Parent Talk to Child	151	0.24	6.741	.000**	0.02	6.002	.000**
Unconditional	151	0.57	0.678	-	0.11	1.598	-
Close Involvement	151	0.12	5.121	.000**	0.01	4.561	.000**
Unconditional	151	2.89	5.779	.000	0.29	5.578	.000
Prompt/Expansion	151	0.62	4.719	.000**	0.04	3.053	.003*
Unconditional	151	3.74	10.667	.000	0.35	9.919	.000
Positive/Exuberant Response	151	1.33	3.950	.000**	0.11	3.629	.001**
Unconditional	151	4.78	14.121	.000	0.41	13.261	.000
Shared Activity	151	0.58	3.577	.001**	0.08	4.713	.000**

Note: The unconditional model is the Level 1 HLM model without predictor variables. The intercept represents developmental level at the midpoint of the age range (23.5 months). The slope represents developmental change per month. Significance levels of .05 or better are listed in the table; asterisks indicate those Level 2 predictors that meet the .01 standard.

* p < .01
** p < .001

FIGURE 2
MODELED GROWTH TRAJECTORIES FOR VERBAL COMMUNICATION ACROSS LEVELS OF PARENT TALK



What Was the Relationship of Program Engagement to Parent Responsiveness and Child Development?

Given the results of the previous analyses, our next question was whether responsive parent behavior would be more frequent among those families who had participated most actively and consistently in EHS services. Although group differences were modest, parents with the highest level of program engagement had higher rates of verbal responsiveness with their children (see Table 4). In other words, those parenting behaviors that were most clearly related to child outcomes occurred more frequently in families who were highly engaged in the EHS program. Moreover, engagement in the program was predictive of more positive outcomes in children's cognitive development and verbal communication and of growth over time in verbal communication (see Table 5). Thus, the present results are consistent with previous evidence of a positive relationship between program engagement and developmental progress at 24 months (Atwater, Carta, Summers & Staker, 2001) and suggest that responsive interactions might be one of the processes that underlie that relationship.

Taken together, these analyses provide empirical support for the EHS program's emphasis on responsive parent-child interactions as a key component of intervention for children and families who experience multiple risks.

TABLE 4
DIFFERENCES IN RESPONSIVENESS ACROSS LEVELS OF PROGRAM ENGAGEMENT

	Level of Program Engagement			
Responsiveness Measure	Low (n=21)	Moderate (n=27)	High (n=26)	df = 2,70
Parent Talk to Child	16.37	19.81	25.71	F = 4.799**
Close Involvement	43.02	38.01	46.63	-
Prompt/Expansion	2.55	3.28	5.00	F = 3.990*
Positive/Exuberant Response	0.80	0.98	1.91	F = 3.491*
Shared Activities	0.12	0.78	0.96	-

Note: The Cumulative Risk Index was entered as a covariate in these analyses.

* $p < .05$
**$p < .01$

TABLE 5
HLM ANALYSES OF PROGRAM ENGAGEMENT AS A PREDICTOR OF CHILDREN'S COGNITIVE DEVELOPMENT AND VERBAL COMMUNICATION

Predictors	df	Intercept			Slope		
		Coefficient	T	P	Coefficient	T	P
Cognitive Development							
Unconditional	75	115.66	49.673	.000	3.04	11.825	.000
Risk	75	-0.96	-1.961	.050	-0.04	-0.761	-
Engagement	75	0.33	2.681	.008*	-0.01	-0.951	-
Verbal Communication							
Unconditional	71	-0.67	-0.336	-	0.10	0.512	-
Risk	71	0.85	1.660	-	0.05	0.890	-
Engagement	71	0.31	3.103	-.002*	0.02	2.686	.008*

Note: The unconditional model is the Level 1 HLM model without predictor variables. The intercept represents developmental level at the midpoint of the age range (23.5 months). The slope represents developmental change per month. Significance levels of .05 or better are listed in the table; asterisks indicate those Level 2 predictors that meet the .01 standard.

* p < .01
** p < .001

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EARLY HEAD START IMPACTS ON PARENTAL STRESS AND HARSH PARENTING ATTITUDES AMONG RURAL FAMILIES

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In addition to examining key child outcome measures, the Early Head Start (EHS) evaluation study has sought to examine impacts on parenting knowledge, attitudes, and behavior. Early Head Start programs such as Early Education Services in Windham County, VT, see parenting as a critical pathway in influencing the development of infants and toddlers. To supplement national findings and to inform practice at the local level, researchers at the Harvard Graduate School of Education gathered longitudinal data at the VT site that provide a closer look at parenting stress and parenting attitudes. This effort was motivated by the belief that goal setting for families with young children in programs like EHS can be enhanced by a greater awareness of the range of parent-related needs and how those needs may change over time as infants and toddlers mature. This study, then, was designed to examine parenting stressors and child rearing attitudes, as well as emotional issues such as parental depression, anxiety, and rigidity, that may influence the quality of parenting for children in rural families such as those living in VT.

Method

The sample for this study consisted of 141 parents at the VT site[1]. All of the primary caregivers were mothers. More than half of these rural families, like many of their urban counterparts, consist of single female heads of household. Most mothers were between 20 and 29 years old at enrollment in the study; the youngest was 17 years old and the oldest 41. The majority of the mothers enrolled in the study just after the birth of their first child. In contrast to families in some urban sites, the vast majority of families in the VT sample are white native English speakers. Families in the comparison group received services typical for this community. The state of Vermont has been one of the most progressive in the promotion of services for young children. For example, most children in the state receive some form of home visitation during the first year of life. Childcare services are more readily available and more comprehensively funded by the state than in many other states (Vermont Agency of Human Services, 2001). Consequently, many of the services offered by EHS were available to mothers in the comparison group, though components were not coordinated and were not provided continuously over time as they were for program families served by Early Education Services.

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[1] Five of the participants from the original study sample only had baseline data and were excluded from all analyses.

The goal of this study was to examine parenting stress and parenting attitudes over time. Parenting stress was measured by the Parenting Stress Index-Short Form (PSI; Abidin, 1995), the short version of a well validated instrument that yields measures of parental distress, parent-child relationship, and the parent's perception of the child's functioning, as well as a measure of total parenting stress. Harsh parenting attitudes were measured using the Child Abuse Potential Inventory (CAP; Milner, 1986), a 120-item questionnaire that provides an indication of the potential for harsh or abusive parenting, as well as more specific indices of distress, rigidity, and unhappiness. Both the PSI and the CAP are self-report measures. Each was administered on four occasions: at baseline (i.e., enrollment in the study) and at child ages 14, 24, and 36 months.

In this report, we first present descriptive baseline data for the sample as a whole. Next we compare observed levels of parenting stress and harsh parenting attitudes at successive points in time for the program and comparison groups. Finally, based on individual growth modeling, we examine group differences in rate of change in parenting stress and harsh parenting attitudes over time.

Results

Baseline. Wide variation was observed in both parenting stress and parenting attitudes at the time of enrollment. Based on the PSI, mothers in this sample found parenting more stressful than the average parent in the general population. However, sample mothers' perceptions of parenting stress varied from a low total parenting stress score (7th percentile), indicating no stress in the parenting role, to a high total stress score (98th percentile), in which stress was the norm in almost every domain of parenting. Based on clinically validated cut-off values established by the authors of PSI, parents were considered to be at "high levels" of stress if their total parenting stress score was above the 85th percentile. In this sample, responses of over a fourth of the mothers (28 percent) indicated high levels of parenting stress.

Maternal responses to the CAP questionnaire also showed wide variation in mothers' parenting values and beliefs and emotional health. Maternal responses varied from the 1st to the 99th percentile in terms of predicted potential for harsh parenting practices (i.e., acting in a physically abusive way toward their children). Using the clinical cut-off of the 95th percentile as an indicator of high risk parenting (Milner, 1986), over a fourth (26 percent) of the mothers in our sample expressed potentially harsh, abusive values and beliefs about their children. With respect to the mother's emotional well-being, problems most frequently identified as influencing the potential for harsh parenting and child abuse included emotional health indicators of unhappiness/depression (reported by 26 percent of the mothers) and emotional distress (reported by 22 percent of the mothers). In contrast, many mothers saw their relationships with their infants and toddlers as positive (95 percent). One fifth of the mothers felt that their lives were relatively stress-free in terms of their parenting (PSI 19 percent) and emotional health (CAP 21 percent). These indices speak to the strengths, as well as the risks, of most families at baseline.

Change over time for each group. We next asked whether there were changes in parenting stress, harsh parenting attitudes, and emotional mental health in the mothers over time. Changes in the level of *total parenting stress*, in *parental distress* (subscale of the PSI) and in *harsh parenting attitudes* were observed for the sample as a whole across time. The level of parenting stress fell for both groups across time, with the highest stress usually reported during the child's infancy (see Table 1). The change over time was most striking for parenting distress. These findings support the notion that infancy is a relatively stressful period of adjustment and reaffirm the importance of intervention with families as early as possible in the lives of young children.

Group differences in levels at each time point. There were no statistically significant differences in levels of total parenting stress, parenting distress subscale scores, harsh parenting attitudes, or in maternal mental health at baseline. However, by the time children were 14 months of age, statistically significant differences between the groups were evident, with parents in the program group showing lower levels of total parenting stress ($t = 2.39$, $p = .01$) and parental distress ($t = 2.73$, $p = .007$). At 24 months statistically significant group differences, again favoring the program group, were noted in total parenting stress ($t = 3.2$, $p = .001$), parental distress ($t = 3.76$, $p = .0003$) and in harsh parenting attitudes ($t = 2.4$, $p = .01$)[2]. Although both groups on average showed a reduction in all of these risk factors over time, the program group had steeper and more sustainable declines across the four waves of data collection (see Table 1). At 36 months of age, program parents continued to demonstrate statistically lower levels of total parenting stress ($t = 2.09$, $p = .03$) and parental distress ($t = 3.2$, $p = .001$). In addition, they showed lower levels of maternal unhappiness/depression ($t = 2.2$, $p =$

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[2] Both scales measure the presence of negative factors in parenting. Therefore lower scores indicate a reduction in these negative factors.

TABLE 1
MEANS AND STANDARD DEVIATIONS OF RAW SCORES FOR TOTAL PARENTING STRESS, PARENTAL DISTRESS, AND HARSH PARENTING ATTITUDES ACROSS TIME

	Total Parenting Stress	Parenting Distress Subscale	Harsh Parenting Attitudes
Baseline			
EHS Group			
Mean	73	27	111
SD	13	7	101
Comp Group			
Mean	77	30	125
SD	16	7	92
14 Months			
EHS Group			
Mean	66	26	97
SD	15	8	85
Comp Group			
Mean	74	30	107
SD	21	10	88
24 Months			
EHS Group			
Mean	61	22	84
SD	14	8	71
Comp Group			
Mean	71	29	74
SD	18	9	104
36 Months			
EHS Group			
Mean	65	22	74
SD	16	8	76
Comp Group			
Mean	74	28	98
SD	23	11	79

.03). By this point, there were no longer group differences in harsh parenting attitudes as measured by the CAP.

Group differences in rate of change over time. Analysis of rates of change over time offered further evidence of greater decrease in parenting stress and harsh parenting attitudes among parents enrolled in EHS, relative to parents in the comparison group. Specifically, parents in the program group showed greater rates of change (i.e., decline) in both total parenting stress (t = 2.02, p = .04) and in parental distress (t = 2.73, p = .007) than did parents in the comparison group.

Discussion

Mothers with young children living in poverty in rural America can benefit from EHS intervention even in a community where a number of other, albeit less coordinated, services are available to low-income families. Parenting stress appears to be highest during the child's first year of life. Although reduction in parenting stress is observed among all parents as infants mature, the rate of reduction is accelerated among parents participating in EHS. Change is most notable in the parent's own distress around parenting (rather than her perception of her child as a 'difficult' child). As with parenting stress, harsh parenting attitudes appear to diminish over time among parents in both the program and comparison groups. Nonetheless, intervention does appear to have a beneficial impact on harsh parenting attitudes, particularly around child age 2. It may be that this is a period of parenting development when issues around discipline are more salient and during which coordinated interventions for both parent and child may be most valuable.

Taken together, these results suggest that the coordinated child and family-focused services of EHS have the potential to change parenting attitudes and practices. The reduction of parenting stress and parents' feelings of increased competence are important for framing positive parenting for the future. Among mothers of 2-year-olds, EHS also appears to reduce depression and unhappiness, two major impediments to positive parenting. Programs serving families like these must be able to assess each family's needs in terms of risks and strengths and develop an intervention plan tailored to individual needs. The above findings point out the importance of targeting the reduction of parental distress and depression as critical goals for intervention during the child's first three years of life.

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MOTHERS' SOCIALIZATION OF TODDLER CONFLICT RESOLUTION

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Numerous studies show that peer conflict is quite prevalent in young children's lives. As part of children's socialization, parents transmit beliefs regarding appropriate responses to conflict situations. Extant literature suggests that as these beliefs become instantiated in parental behavior, they influence children's social behavior and become critical to the development of social competence.

One such belief about conflict resolution is that aggression is a legitimate solution to social problems. Parents who fail to intervene when children behave aggressively implicitly communicate to their young children that aggression is acceptable. Investigations have linked the belief that aggression is a socially acceptable response with childhood aggression. This is troublesome since children's early patterns of aggression become increasingly stable and destructive as they grow older. Fortunately, intervention programs that target social problem solving have shown that the cognitions underlying aggression are potentially modifiable especially if interventions are introduced early.

While many studies demonstrate the importance of mothers' attributions of their children's social behaviors and mothers' overall parenting goals, few studies have investigated low-income mothers' beliefs about how their children should resolve peer conflicts. Likewise, many studies of children's conflict resolution have been conducted with elementary school children and have not been extended to parents' socialization of toddler conflict resolution. Therefore, in this particular examination, we sought to characterize mothers' attitudes about the strategies that their young children should employ in conflict situations with peers. We also explored how these maternal beliefs are affected by participation in Early Head Start.

The sample was comprised of a subset of families from the 36-month Early Head Start (EHS) cohort in New York City. Sixty mothers of 27 girls and 33 boys were participants in this particular study. Mothers' mean age at the time of their children's 3-year-old birthday was 24.6 (SD = 7.1). Mothers were from ethnically diverse backgrounds. Children's gender and mothers' ethnicity did not relate to maternal beliefs about conflict resolution.

During the 36-month-home visit, mothers were instructed to complete a conflict resolution self-administered questionnaire. The questionnaire was based on a social problem-solving scale used by Slaby and Guerra (1988) geared to a sample of adolescents. The questionnaire required mothers to choose strategies that they would want their 3-year-old children to use in four hypothetical conflict situations. Participants were asked to imagine that their child was involved in a situation with a peer who is intrusive or interferes with a goal, such as in the following situation:

Your child is standing in line for a drink at a water fountain. Another child comes along and pushes your child out of the way and takes his/her place. *What would you want your child to do?* (fill in **ALL** that apply)

☐ Call the other child names.

☐ Push the other child out of the way.

☐ Walk away.
☐ Tell an adult (parent, teacher) and ask for help.

☐ Tell the other child that "This is my place, please get in line."

The other three scenarios depicted conflict over a toy, name-calling, and physical belligerence. For each conflict, mothers were presented with solutions appropriate to the target situation. The five solutions reflected: *ask an adult for help, verbal prosocial responses* (words with peers), *walk away, physical aggression*, and *verbal aggression*. Chronbach's alpha ranged from .66 to .89 indicating the internal reliability of the scale.

The ranges for *ask an adult for help, verbal prosocial responses, walk away, physical aggression, and verbal aggression* were 0-4, 0-6, 0-4, 0-3, and 0-1, respectively. To assess mothers' beliefs regarding their children's resolution of peer conflicts, frequencies of the five strategies were calculated across the four situations. Ninety-two percent of the mothers responded that *ask an adult for help* was desirable as opposed to 8 percent who did not choose the strategy once (see Figure 1). In fact, 29 of the mothers believed that asking an adult for help was preferred in all four situations. Responses that were verbally *prosocial* (with peers) were also common in that 75 percent of the mothers preferred it at least once; 25 percent of the mothers did not single it out (see Figure 2). Thirty-eight percent chose *walk away* at least once while 62 percent never viewed it as a way to solve peer conflicts (see Figure 3). Surprisingly, 23 percent of the mothers opted for *physical aggression* while 77 percent did not (see Figure 4). Only 8 percent of mothers stated that *verbal aggression* was an appropriate strategy at least once. Ninety-two percent never chose *verbal aggression* as a justifiable response to peer conflict (see Figure 5).

Some interesting patterns emerged regarding mothers' number of children and age. Mothers with more children were less likely to consider *walk away* as a viable alternative in conflict situations as compared to mothers with less children (r = -.29, p < .05). Older mothers were more likely than younger mothers to view *verbal prosocial* peer strategies as legitimate responses to peer conflict (r = .26, p < .05).

FIGURE 1
PERCENTAGE OF MOTHERS WHO ENDORSED ASK AN ADULT FOR HELP PEER CONFLICT RESOLUTION STRATEGY
N = 60

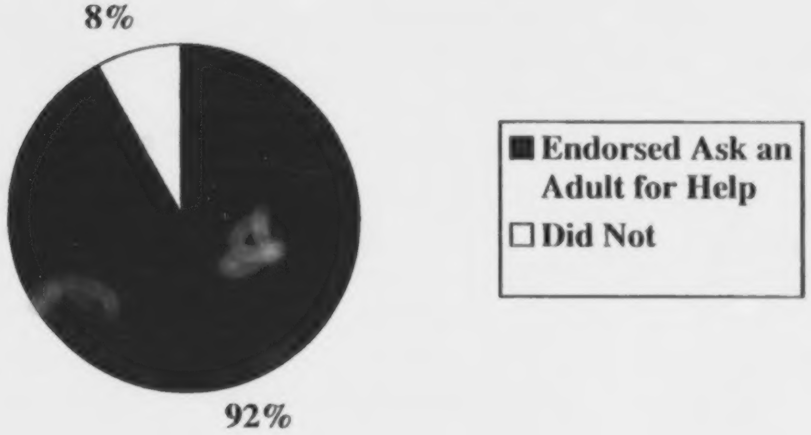


FIGURE 2
PERCENTAGE OF MOTHERS WHO ENDORSED VERBAL PROSOCIAL RESPONSES PEER CONFLICT RESOLUTION STRATEGY
N = 60

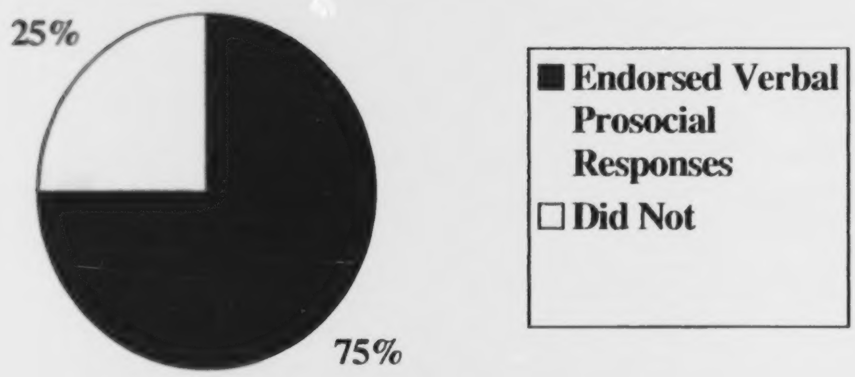


FIGURE 3

PERCENTAGE OF MOTHERS WHO ENDORSED WALK AWAY PEER CONFLICT RESOLUTION STRATEGY, N = 60

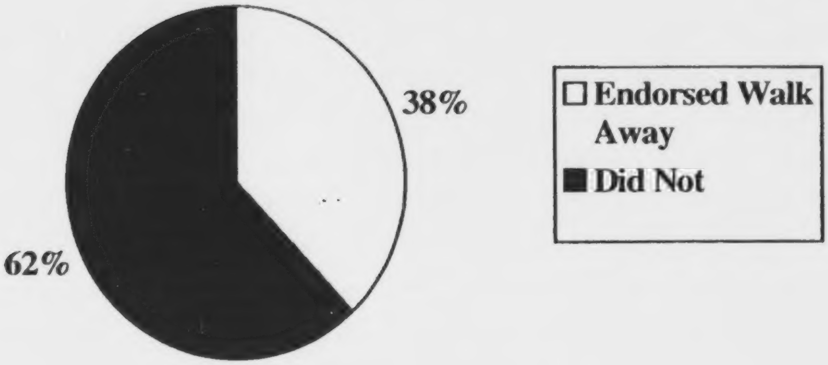


FIGURE 4
PERCENTAGE OF MOTHERS WHO ENDORSED PHYSICAL AGGRESSION PEER CONFLICT RESOLUTION STRATEGY, N = 60

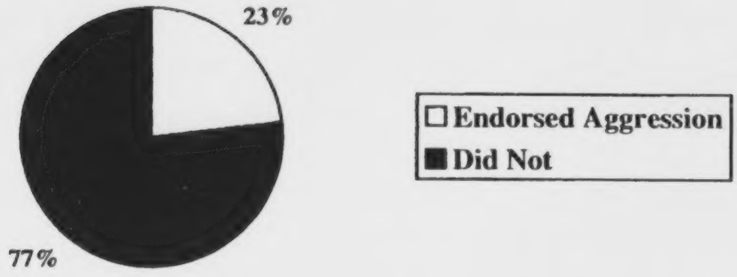
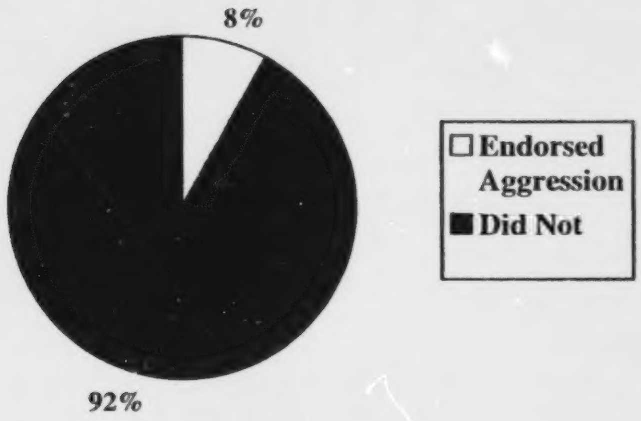


FIGURE 5
PERCENTAGE OF MOTHERS WHO ENDORSED VERBAL AGGRESSION PEER CONFLICT RESOLUTION STRATEGY, N = 60



868

Although it was possible for mothers to choose both aggressive and prosocial responses in the same situations, mothers tended not to do so. Mothers who chose *physical aggression* as a strategy were less likely to choose *verbal prosocial responses* (r = -.27, p < .05). Mothers who selected *verbal prosocial* strategies and *ask an adult for help* were less likely to select *verbal aggression* (rs = -.36, and -39, ps < .01). In contrast, mothers who viewed *verbal aggression* as a solution to peer provocation tended to view *physical aggression* as a noteworthy strategy (r = .47, p < .001). *Walk away* was not associated with any other variables.

Multiple t tests were calculated to examine the effects of Early Head Start on mothers' beliefs about strategies for children's peer conflict resolution. When Treatment mothers (N = 28) were compared to Control mothers (N = 32), no differences were found regarding conflict resolution strategies. However, many of the families randomly assigned to the two Early Head Start sites, Teen Aid High School and Educational Alliance, did not actually participate at the centers. Hence, program participation was determined by the staff at the Early Head Start sites. Families were considered to be "receiving" Early Head Start services only when attendance was "fair" or better and were called attendees. Families with "poor" attendance (no services from EHS) were excluded from further analyses. Importantly, findings suggested that the poor attendees had more traditional values, more violence in their lives, and less social support than attendees (M. Spellmann, personal communication, 2002).

Teen Aid attendees (N = 8) advocated *walk away* more than Teen Aid controls (N = 15), t(21) = 2.12, p < .05. Educational Alliance attendees (N = 7) endorsed *physical aggression* and *walk away* less than controls (N = 17), t(22) = 2.50, p < .05 and t(22) = 1.77, p < .10. In contrast to controls, mothers who received services from Educational Alliance tended to support *ask an adult for help*, t(22) = 1.94, p < .07.

In this study, we sought to elucidate mothers' attitudes about how their children should resolve peer conflicts. Although the literature suggests that mothers see their children's peer aggression as misbehavior, almost one quarter of the mothers in this study endorsed physical aggression as a desirable strategy in resolving peer conflict. This belief contributes to a socialization environment in which the child believes that aggression is appropriate and acceptable. In fact, highly aggressive children and adolescents see aggression as a legitimate response to social discord.

An important finding was that most of the mothers in this study selected conflict resolution strategies predictive of children's prosocial competence. In addition, mothers were consistent in their adoption of strategies. In general, those mothers who endorsed verbal aggression also endorsed physical aggression. Mothers who promoted verbal prosocial peer responses and asking an adult for help did not advocate aggression.

Although aggression is a relatively stable behavior, our findings suggest that mothers' beliefs about children's conflict resolution can be modified by intervention. Teen Aid mothers supported walking away more often than those participants who did not attend Teen Aid. Mothers that were present at Educational Alliance endorsed physical aggression less often than those participants who did not attend Educational Alliance. Instead, Educational Alliance mothers wanted their children to ask adults for assistance with peer disputes. It is notable that attendance in Early Head Start did not impact mothers' selection of prosocial peer responses, a solution touted in the literature and in schools. Programs may need to educate parents about the benefits of encouraging children to employ verbal strategies in negotiations with peers. Nevertheless, three quarters of the mothers chose this strategy at least once indicating that prosocial verbal negotiation is a recognized solution of mothers in this sample.

It is likely that Early Head Start program participation, perhaps by informing parenting or influencing child behaviors, positively influenced mothers' beliefs about how children should resolve peer conflict. Specifically, antiviolence messages, such as encouraging teens to walk away from potential conflicts, were possibly modeled and promoted in the Early Head Start sites. The particular content of the Early Head Start programs, which supported nonaggressive prosocial beliefs, should be identified to facilitate replication in other centers.

This study aimed to shed light on the value of maternal beliefs in shaping young children's resolution strategies in peer conflicts. However, it must be remembered that a mother's approach to conflict resolution is just one, albeit important, facet of a broader childrearing perspective. Further research should illuminate how parental beliefs emerge, how beliefs contribute to the developmental outcomes of children, and the styles of parenting that beliefs subsume.

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872

EARLY HEAD START INTERVENTION WITH FAMILIES AND FAMILIES' INVESTMENT IN CHILDREN

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A federally funded program serving young economically disadvantaged families with children under 3, United Cerebral Palsy Early Head Start in Northern Virginia (EHS) promoted child development through a flexible mixture of individualized, needs-oriented child and family services. The child-focused services included center-based childcare, family-based childcare, and home visiting. The family-focused services included parent mobilization activities and linkage to community resources on behalf of parents and children. In particular, parent mobilization involved psychosocial, informational, and task-focused practice activities designed to enable parents to fulfill their parenting roles, achieve family well-being, and move toward family economic self-sufficiency. Linking to community resources involved EHS staff's assistance in connecting families to their communities in order to secure supplemental services that support and promote children's healthy development, parents' competencies in childrearing, and parents' personal development. To date, however, little is known about how the provision of EHS services strengthens family functioning, parental investment in their children, and children's social development.

In exploring program impact on 73 EHS participants, the research team from The Catholic University of America: (a) assessed family needs and identified family aspirations at enrollment; (b) documented the type and amount of EHS services delivered to families; and (c) assessed family functioning and child social development when the enrolled child reached 30 months of age, a date six months prior to program exit. The researchers further explored whether variance in service delivery was associated with a family's status as a U.S. born or immigrant family. Last, the researchers explored whether EHS service delivery was congruent with families' needs and aspirations at enrollment, and, in turn, whether such congruence empowered families to achieve greater competency in their pre-exit functioning; and whether family functioning created a family environment with increased investment in the targeted EHS children and, thereby, promoted the children's social development at 30 months.

Research Design

The investigation of pathways to desired child and family outcomes is based on information gained from 73 families, who were randomly assigned to participate in the EHS program. This study used an experimental research design with quantitative enrollment and

pre-exit measures and qualitative categorization of service activities by EHS staff.

Enrollment and Pre-Exit Measures

The enrollment data and pre-exit data from mothers were collected through structured interviews conducted by trained interviewers. Mothers were selected as respondents because of their universal presence and availability for interviews. Spanish-speaking interviewers and bilingual interpreters for other languages were used as needed.

Family Status. Because cultural identity affects people's perception of their needs, life style, and actions (Shonkoff & Phillips, 2000), families were identified as having an immigrant family birth status and lifestyle when the mother was born outside the U.S.

Enrollment Assessment of Family Needs and Resources. Adequacy of family resources for meeting needs was measured by the Family Resource Scale (Dunst & Leet, 1987; Wall, et al, 2000), a measure with established validity and reliability. The 33 items form five conceptual clusters denoting needs and wants for adequate level of living, needs for parenting supports, monetary resource wants, interpersonal resource wants, and personal resource wants. The 5-point Likert scale ranges from "never" to "always" adequate with a total score of less than 130 reflecting perception of family resources as usually inadequate.

Enrollment Family Goals and Aspirations. Family goals and aspirations were measured by an 11-item scale, which reflects parents' desire for future achievement and personal change in gaining greater economic self-sufficiency, improving their living situation, and increasing their family life satisfaction. The dichotomously scored items were adapted from the *Teenage Parent Demonstration Second Follow-Up*, a population survey similar in age and cultural diversity to the present sample (Aber, Brooks-Gunn & Maynard, 1995).

Pre-Exit Family Functioning Family functioning competencies were measured by an abbreviated 24-item Family Functioning Scale (Dunst, Trivette & Deal, 1988). The 5-point Likert scale reflects strengths associated with family commitment, appreciation, sense of purpose, congruence, communication, sense of relationship, coping, problem solving, positivism, flexibility, and sense of balance. The items cluster around three factors of family identity, information sharing, and coping and resource mobilization. The total score reflects overall competency in family functioning. The scale has established validity and an appropriate internal consistency alpha of .89.

Pre-Exit Family Investment in their Child. Family investment in the targeted child was conceptualized as parents' perception of their emotional and time availability for their child and was measured by two Likert-scaled items comprising one factor with established validity from the long form of the Family Functioning Scale (Dunst, Trivette & Deal, 1988).

Pre-Exit Child Social Development. Children's social development was measured by the 83-item Child Behavior Checklist (CBCL) (Achenbach, 1992), a measure with an established validity and reliability. The total score of this 3-point Likert scale identifies problems in children's social behavior based on established age norms.

Documentation of EHS Services Delivered

In order to assess the range and scope of EHS services documented in children's case records, a structured case-record review guide was developed from the monthly staff notations of service activities targeted to EHS children and families. In collaboration with the program staff and research team, the leading author developed the data collection instrument and trained a doctoral social work student in its use. To achieve consistency, the researcher and the doctoral student cross-referenced their procedures until they reached complete agreement for data categorization, interpretation, and documentation.

Child Care and Program Services. As this particular EHS center provided a flexible mixture of individualized, needs-based child and family services, it was possible for targeted EHS children to be serially enrolled in one to three program types for up to 3 years. For example, the family could enroll the child in the child development center (CDC) program, family child care (FCC) program, or home visiting (HV) program, or some sequential combination of the three programs.

Linkage to Community Services. The staff's linking of families and children to community services included referrals (phone calls and letters), advocacy contacts (meeting with other professionals or other agency representatives) on behalf of children and parents, and assistance with transportation or accompaniment to services. The recorded monthly contacts were tabulated and average monthly scores identified.

Parent Mobilization Services. These services included practice activities targeting child and family needs. Content analysis of narrative themes yielded 19 items reflecting child needs, 26 items reflecting family needs for parenting and self-sufficiency, and 20 items reflecting parents' personal needs. Specifically, practice activities targeting *child needs* clustered around child care, child health including insurance issues and illness status, child development (speech and

876

language, eating and nutrition, gross and fine motor development, toilet training), developmental delay including provision of assessment and early intervention services, child psychosocial behavior (socialization, play, and behavior self-control), parent-child relationship, and age-related transitioning out of EHS services. Practice activities targeting *family needs* clustered around: (a) parenting issues such as knowledge of parenting and disciplinary practices appropriate for infants and toddlers, and parent management of issues surrounding child custody and abuse/neglect, toys, child safety at home and in the neighborhood, and siblings' developmental and educational needs; and (b) self-sufficiency issues such as parents' concern about their legal status, education, employment, family income, extended family living in their household, and provision of household necessities (living space, food, clothing, transportation, telephone). Practice activities targeting *parents' personal needs* clustered around parents' health (insurance issues, health status, disability), mental health (mood, aggression, substance abuse), employment-related coping issues, marital or partner relationship issues, and community involvement.

Findings

Demographic Profile

Located along a busy corridor in a suburban Virginia county, the EHS center was part of a commercial strip mall in a densely populated multicultural area about 30 minutes south of Washington D.C. The center served economically disadvantaged families living predominantly in motels and low-rise apartments within a 10-mile radius.

Of the 73 EHS families, 19 percent enrolled in 1996; 44 percent enrolled in 1997; and 37 percent enrolled in 1998. Of all the families, 56 percent (N = 41) were U.S.-born and 44 percent (N = 32) were immigrant families. Most of the children in these families were enrolled by one year of age and several mothers were pregnant at enrollment. One third (32 percent) of all families had one child; one third (36 percent) had two children; and one third (32 percent) had three to five children. Close to three-quarters (70 percent) of the targeted children lived with two parents and relatives; one fifth (20 percent) lived with a single parent (mother), and few (10 percent) lived with a single mother and relatives.

The families differed in parents' age, income, education and cultural heritage ($p< .05$). Immigrant families had mothers ($M = 28$, $SD = 6$) and fathers ($M = 33$, $SD = 7$) who were somewhat older, had slightly lower average poverty-based income ($M = \$11,958$, $SD = \$4,519$), were mainly of Spanish-speaking heritage (78 percent), and had mothers who have not completed high school education (65 percent). In comparison, the US-born families had mothers ($M = 24$, $SD = 4$) and fathers ($M = 26$, $SD = 7$) in their mid-twenties, had slightly higher but still poverty-based income ($M = \$13,226$, $SD = \$4,756$), were predominantly of African American (41 percent) or Caucasian heritage (39 percent), and had mothers who were more likely to have completed high school (81 percent).

The participating families did not differ in employment self-sufficiency in that three-quarters (75 percent) of mothers were unemployed while four-fifths (86 percent) of fathers were employed either part- or full-time.

Amount and Type of EHS Services Delivered

Program Types. Over two-thirds (66 percent) of families received home visiting, family childcare, or a combination of the two; the remainder (34 percent) received center-based childcare or a combination of center-based child care with family childcare or home visiting. When analyzed by family status, however, almost all (94 percent) immigrant families received family childcare, home visiting, or the two combinations. The US-born families differed from immigrant families in that half (51 percent) received center-based child care or a combination of center-based childcare with home visiting or family child care, while the other half (49 percent) received a combination of family childcare and home visiting ($x^2 = 16.8$, df = 1, p = .000, Phi = .5).

To assess the amount of service received, the first and last known contact dates were adjusted for the number of times the EHS family could not be reached at their known address.

Length of time in the program (months) = Date of the last monthly note – Date of the first monthly note
Length of time served by the program (months) = Length of time in the program - Number of missed contacts

Therefore, based on the presence of the first and last documented monthly contact note, families participated in EHS for 25 months (SD = 10) on average and missed contact for 3 months (SD = 3) on average. Adjusting for absences, the families averaged 22 months (SD = 10) of actual program contact. Table 1 suggests that almost half received 2 to 3 years of actual contact; one-third (33 percent), from 1 to 2 years; and one-fifth (22 percent), less than 1 year.

TABLE 1
EHS PROGRAM CONTACT WITH PARTICIPATING FAMILIES

Length of Program Contact	Number of Families	Percent of Families
6 months or less	7	10%
7-12 months	9	12%
13-24 months	24	33%
25-39 months	33	45%
Total	73	100%

Regardless of the type of EHS program received, immigrant families (M = 26 months, SD = 8) participated significantly longer on average than US-born families (M = 18 months, SD = 10) (N = 73, F = 4.1, df = 72, p = .009).

Linkage to Community Services. Taking into account the actual service contact with families, four-fifths (82 percent) of the families averaged one to two monthly community service contacts; a few (6 percent), three to four monthly community contacts. Some families (12 percent) did not use such assistance. The type of program and family status did not influence provision of linkage.

Parent Mobilization for Children's Needs. Adjusted for the duration of actual EHS service contact, families received an average of two to three (SD = 1) activities per month (see Table 2) to assist with their children's needs. The type of program and family status did not influence the delivery of parent mobilization activities for children's needs.

TABLE 2
EHS PARENT MOBILIZATION FOR CHILDREN'S NEEDS PER MONTH OF SERVICE CONTACT

Number of Child-based Activities per Month of Service Contact	**Number of Families**	**Percent of Families**
Less than 1 Child Activity	4	5%
1-2 Child Activities	15	21%
2-3 Child Activities	32	44%
3-4 Child Activities	14	19%
4-5 Child Activities	8	11%
Total	73	100%

Parent Mobilization for Family Needs. Adjusted for the duration of actual EHS service contact, families received an average of one to two (SD = 1) activities per month (see Table 3) to assist with their overall family needs.

TABLE 3
EHS PARENT MOBILIZATION FOR FAMILY NEEDS PER MONTH OF SERVICE CONTACT

Number of Family-based Service Activities per Month of Service Contact	Number of Families	Percent of Families
Less than 1 Family Activity	15	21%
1-2 Family Activities	39	53%
2-3 Family Activities	10	14%
3-4 Family Activities	5	7%
4+ Family Activities	4	5%
Total	73	100%

Family status, however, influenced the total amount of parent mobilization for family needs (see Table 4). That is, immigrant families received an average of two parent mobilization family-based activities per month while US-born families received one such service activity per month.

Furthermore, examining the range of parent mobilization for family needs revealed that immigrant families (M = .5, SD = .4) received activities slightly more focused on parenting issues per month than US-born families (M = .3, SD = .3) (N = 73, F = 6.4, df = 1, p = .01).

TABLE 4
UNIVARIATE ANALYSIS OF VARIANCE: AVERAGE NUMBER OF TOTAL OF 26 PARENT MOBILIZATION ACTIVITIES FOR FAMILY NEEDS PER MONTH OF SERVICE (N 73)

Source	DF	Mean Square	F	Sig.
Model	3	7.2	4.8	.004
Intercept	1	102.9	68.3	.000
Program*	1	1.63E-02	.01	.917
Family Status**	1	8.1	5.4	.023
Program by Family Status	1	5.5	3.7	.059
Error	69	1.5		

* HV or FCC and CDC program services
** US-born and Immigrant families

Parent Mobilization for Parents' Personal Needs. Adjusted for the duration of actual EHS service contact, families received an average of one to two (SD = .7) activities per month targeting parents' personal needs (see Table 5). Family status and the type of EHS program did not influence parent mobilization for parents' personal needs.

TABLE 5
EHS PARENT MOBILIZATION FOR PARENTS' PERSONAL NEEDS PER MONTH OF SERVICE CONTACT

Number of Parents' Personal Needs Service Activities per Month of Contact	Number of Families	Percent of Families
Less than 1 Personal Need Activity	25	34%
1-2 Personal Needs Activities	36	49%
2+ Personal Needs Activities	12	16%
Total	73	100%

Total Number of EHS Parent Mobilization Services. Adjusted for the duration of actual EHS contact, families received an average of five to six total parent mobilization activities per month targeting their overall needs or the needs of their children, the whole family, and their own personal needs (see Table 6). Family status influenced total parent mobilization in that immigrant families (M = 6, SD = 2) received slightly more total parent mobilization than US-born families (M = 5, SD = 3) (N = 73, F = 2.9, df = 1, p = .09). The type of program did not exert any influence.

TABLE 6
EHS TOTAL PARENT MOBILIZATION PER MONTH OF SERVICE CONTACT

Number of Total Parent Mobilization Activities per Month of Service Contact	Number of Families	Percent of Families
Less than 4 Total Service Activities	12	16%
4-7 Total Service Activities	50	69%
8+ Total Service Activities	11	15%
Total	73	100%

Psychosocial Assessment at Enrollment Interview

Family Needs and Resources at Enrollment. Participating families averaged a total score of 110 (SD = 20), denoting somewhat less than adequate needs and resources at enrollment. Immigrant families (M = 97, SD = 17) had significantly fewer resources to meet family needs at enrollment than US-born families (M = 120, SD = 16) (N = 73, t = 5.7, df = 73, p = .000).

Family Aspirations at Enrollment. Families averaged 8 (SD = 3) out of 11 possible future goals and aspirations. Goals and aspirations did not vary by family status designation.

Outcomes at Pre-Exit Interview

Fifty-five (75 percent) of the 73 families and children originally enrolled in EHS completed the pre-exit (when child turned 30 months) outcome measures, an attrition rate of 25 percent.

Pre-Exit Family Functioning. Families averaged a total family functioning score of 106 (SD = 12), denoting adequate competencies at pre-exit interview.

Pre-Exit Family Investment in Children. Families averaged a total pre-exit child investment score of 9 (SD = 1), denoting a good amount of family investment in children. In addition, families with greater pre-exit family functioning invested more in their children (r = .41, p = .001).

Pre-Exit Child Social Development. Targeted 30 month olds achieved an average social development score of 41 (SD = 20) on the CBCL, denoting absence of clinical problems in socio-behavioral development.

Family Service Delivery, Family Functioning, and Child Social Development

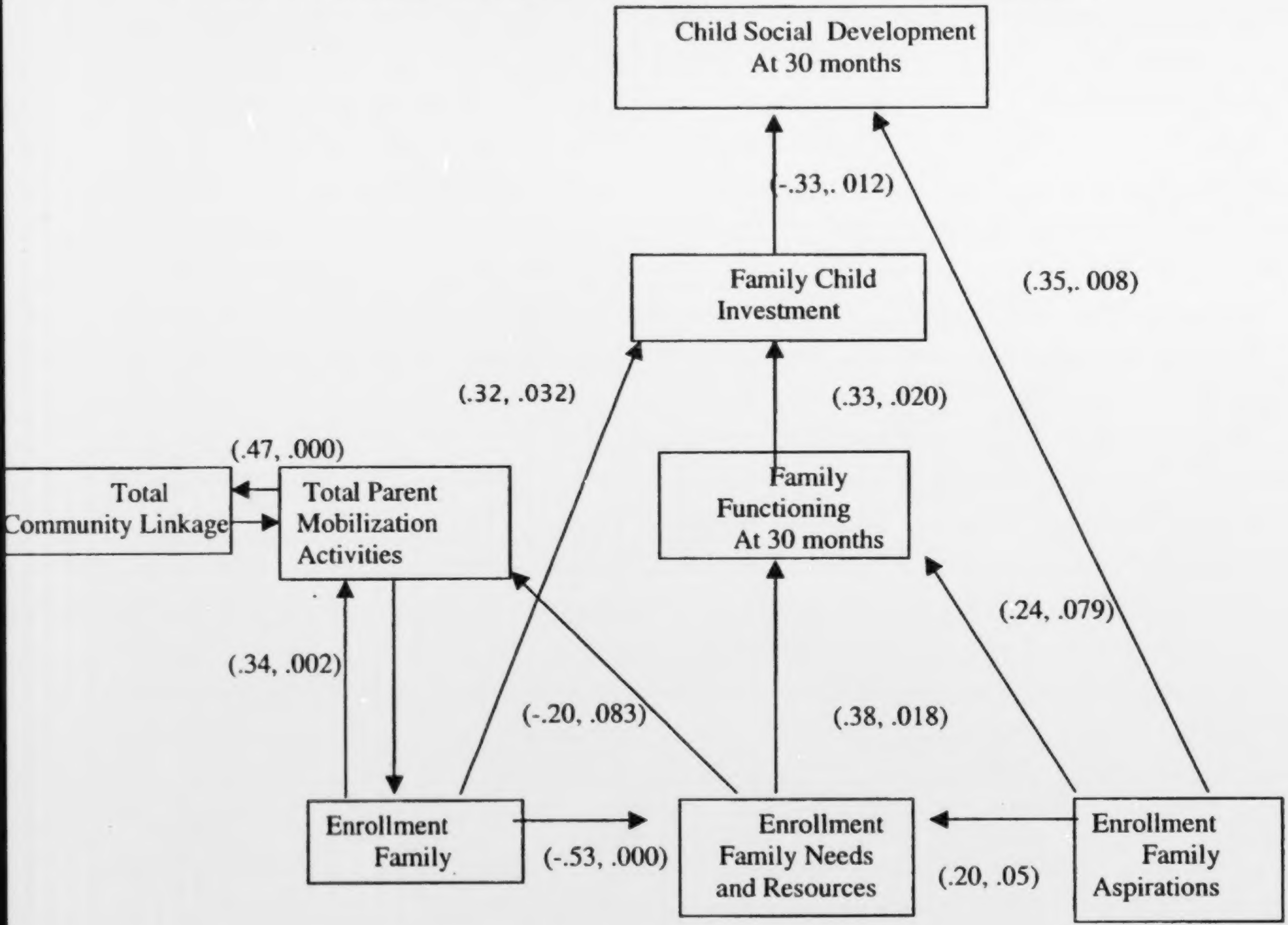
To identify the connection between EHS family-focused service delivery (parent mobilization and linkage to community services), family functioning, and child social development, several path analyses examined the connection among baseline assessment of family needs and resources, aspirations, and family status; total EHS services delivered; pre-exit family functioning and investment in the targeted child; and the development of children's socio-behavioral problems at 30 months of age.

First, bi-variate correlations identified significant (p < .05) correlations between the following pairs of variables and, thereby, possible hypothesized pathways: (a) moderate correlations between EHS parent mobilization and linkage to community services (.48), family status (.45), and family needs and resources (.40); (b) a moderate correlation between family status and family needs and resources (.56), and small correlations with family child investment (.28), and child social development (.29); (c) small correlations between family aspirations and needs and resources (.28), family functioning (.28), and child social development (.29); (d) a small correlation between family needs and resources with family functioning (.32); (e) a moderate correlation between family functioning and family child investment (.42); and (f) a small correlation between family child investment and child social development (.27).

Subsequent multiple regression analyses (MRA) identified the EHS service path to family functioning and child social development (see Figure 1).

FIGURE 1

SIGNIFICANT PATH COEFFICIENTS BETWEEN EHS SERVICE DELIVERY ACTIVITIES, ENROLLMENT FAMILY STATUS, NEEDS AND RESOURCES, AND ASPIRATIONS, AND PRE-EXIT FAMILY FUNCTIONING, FAMILY CHILD INVESTMENT, AND CHILD SOCIAL DEVELOPMENT AT 30 MONTHS


Child Social Development
At 30 months
(-.33,. 012)
Family Child
Investment
(.35,. 008)
(.32, .032)
(.33, .020)
(.47, .000)
Total
Community Linkage
Total Parent
Mobilization
Activities
Family
Functioning
At 30 months
(.24, .079)
(.34, .002)
(-.20, .083)
(.38, .018)
Enrollment
Family
(-.53, .000)
Enrollment
Family Needs
and Resources
(.20, .05)
Enrollment
Family
Aspirations

885

Specifically, 29 percent ($R^2 = .29$) of *child social development* at 30 months of age was significantly predicted by family investment in their child at 30 months and family future aspirations at enrollment (see Table 7). Families who were more invested in their children had children with fewer social developmental problems while families who had more goals for their future had children with more social developmental problems.

TABLE 7
MRA CHILD 30-MONTH SOCIAL DEVELOPMENT WITH PRE-EXIT FAMILY INVESTMENT AND FAMILY FUNCTIONING, AND ENROLLMENT FAMILY STATUS, NEEDS, AND ASPIRATIONS, AND TOTAL DELIVERED EHS SERVICE ACTIVITIES (N 55)

Variable	Beta	T	Sig.
Investment	-.33	-2.6	.01
Aspirations	.35	2.6	.01
Family Status*	-.19		NS
Functioning	.01		NS
EHS Activities	-.02		NS
Needs	-.26		NS

* Immigrant family = 2, US-born family = 1
$R^2 = .29$, F= 5.6, p =.002

Second, 27 percent ($R^2 = .27$) of *family investment* in the targeted child was predicted by family status at enrollment and pre-exit family functioning (see Table 8). Specifically, immigrant families were invested slightly more in their children (M = 9, SD = 1) than U.S.-born families (M = 8, SD = 1). Families with better overall family functioning competencies invested more in their children.

TABLE 8
MRA FAMILY INVESTMENT AT 30 MONTHS WITH FAMILY FUNCTIONING AT 30 MONTHS, AND ENROLLMENT BIRTH STATUS, NEEDS, ASPIRATIONS, AND EHS SERVICE ACTIVITIES (N55)

Variable	Beta	T	Sig.
Family Status*	.32	2.2	.03
Functioning	.33	2.4	.02
Aspirations	.11		NS
EHS Activities	-.16		NS
Needs	.15		NS

* Immigrant family = 2, US-born family = 1
$R^2 = .27$, F=3.5, p=.01

Third, 18 percent ($R^2 = .18$) of pre-exit *family functioning* was predicted by family aspirations and adequacy of family resources in meeting needs at enrollment (see Table 9). Specifically, families who had more aspirations or more adequate resources for meeting their needs had better family functioning when their child turned 30 months.

TABLE 9
MRA PRE-EXIT FAMILY FUNCTIONING WITH ENROLLMENT FAMILY STATUS, ASPIRATIONS, AND NEEDS, AND EHS PARENT MOBILIZATION ACTIVITIES
(N 55)

Variable	Beta	T	Sig.
Needs	.38	2.4	.02
Aspirations	.24	1.7	.08
Family Status*	.19		NS
EHS Activities	.01		NS

* Immigrant family = 2, US-born family = 1
$R^2 = .18$, F=2.8, p =.03

Fourth, 38 percent ($R^2 = .38$) of assessment of *family needs and resources* at enrollment was predicted by family status and family aspirations (see Table 10). Specifically, immigrant families had somewhat more inadequate resources for meeting their needs while US-born families had slightly more aspirations at enrollment.

887

TABLE 10
MRA FAMILY NEEDS AT ENROLLMENT WITH FAMILY STATUS AND ASPIRATIONS (N 73)

Variable	Beta	T	Sig.
Family Status*	-.53	-4.2	.00
Aspirations	.19	1.8	.07

* Immigrant family = 2, US-born family = 1
$R^2 = .38$, F=19.3, p =.000

Last, 45 percent ($R^2 = .45$) of *EHS total parent mobilization* services were predicted primarily by EHS linkage to community services, family status, and family needs and resources at enrollment (see Table 11). That is, immigrant families received more EHS parent mobilization than US-born families but similar linkage to community services.

TABLE 11
MRA EHS PARENT MOBILIZATION ACTIVITIES WITH COMMUNITY LINKAGE ACTIVITIES, ENROLLMENT FAMILY STATUS, NEEDS, AND ASPIRATIONS (N 73)

Variable	Beta	T	Sig.
Linkage Activities	.47	5.2	.00
Family Status*	.34	3.2	.01
Needs	-.21	-1.8	.08
Aspirations	-.01		NS

* Immigrant family = 2, U.S.-born family = 1
$R^2 = .45$, F=14.2, p = .000

Discussion of Findings

The analyses revealed statistically significant and conceptually meaningful pathway relationships among psychosocial assessment of family needs and resources, status, and aspirations at enrollment; pre-exit outcomes of family functioning, family child investment, and child social development; and EHS delivery of service activities (see Figure 1). As demonstrated by these paths, EHS intervention takes place in a psychosocial environmental context far broader than the consideration of the type of EHS program *per se*. Although it may appear puzzling that the type of EHS program (designated in this study by home visiting and family-based childcare or center-based childcare combinations) did not directly influence the proposed pathways to children's social development, it actually was not that surprising to the researchers. That is, in this study, the type of program designation based on the clustering of childcare services was related to family status at enrollment. Through this process, program designation became the extension of family assessment of needs at enrollment, and in turn guided the provision of EHS parent mobilization and linkage to community services.

Specifically, EHS family-focused services associated with the intervention objectives of parent mobilization and linkage to community resources were moderated by families' socio-cultural situation and psychosocial characteristics. The socio-cultural situation associated with economically-disadvantaged families' status designation (immigrant, U.S.-born) aligned with both family needs and resources and family goals, as assessed at enrollment, to create the psychosocial context for EHS service delivery. Through this psychosocial family context, EHS service activities, in turn, influenced family needs and resources. It was observed that at program enrollment, immigrant families had demonstrably more inadequate resources for meeting family need than US-born families. In targeting resource deficits for all families, EHS service activities used the family status as a way of better understanding culturally-based needs and as an entry point for helping families gain a sense of who they are and what they need to do in order to function well in today's society. To facilitate culturally competent service activities and meet identified need, EHS hired staff to accommodate the cultural, linguistic, and individual needs of the predominantly Spanish-speaking immigrant families.

Since service activities matched the needs and resources and goals of families at enrollment, pre-exit family functioning competencies were promoted. Through the focus on identifying and

880

matching the needs of family cultural life style, EHS service activities assisted families in gaining awareness of their strengths and weaknesses, the adequacy of their resources for meeting emotional and instrumental needs, and their goals for the future. Through these culturally based service activities, families gained knowledge about themselves. Thus, EHS services facilitated their pre-exit family functioning.

Further, the psychosocial context of family functioning and family status contributed to families' emotional investment and time availability for their children when children turned 30 months. Families were assisted in learning about themselves (their needs, wants, and aspirations) becoming more competent and investing more in their children.

Their pre-exit family investment in combination with their goals at enrollment became reflected in their children's 30-month social development. This pathway highlighted children's social development as influenced by the meaning that children derive from parent-child interaction defined in this study as parental investment in their children. The pathways also highlighted family aspirations as subject to culturally-interpreted expectations of the future, underpinning parenting and life style actions, and, thereby bearing portent for children's social development. Families with lower family investment in their children or more family goals had children who demonstrated more socio-behavioral problems at 30 months than families with greater child investment or fewer goals for the future. It might be that families who set too many goals for themselves become over-extended. In turn this "over-drive" may become negatively reflected in their children's social development. However, as the children's social development at 30 months demonstrated age appropriate normative behavior, only future longitudinal investigation might clarify such effects or the effects of the EHS service delivery path upon children's future developmental accomplishments.

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ANDREYA EARNS HER HIGH SCHOOL DEGREE: THE ROLE OF EARLY HEAD START

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We met Andreya[1] in 1996, when she was 19 and living with her 1-year-old son, her mother, her 16-year-old brother, and her 12-year-old cousin. She had agreed to participate in our longitudinal case study research learning about the lives of nine Early Head Start families living in the inner core of a large Midwestern city. Like almost all the mothers served by this Early Head Start program, she was African American, young, and single. Shortly before she'd signed up for Early Head Start services, she'd also enrolled in Job Corps[2]. Though she knew very well how much her mother wanted her to finish high school, Andreya had had few models of school success to look to. Neither of the adults she was closest to, her mother and grandmother, had graduated, and by now her older brother had dropped out and was in jail. Her younger brother seemed headed in the same direction. Looking back five years later, she believes, as we do, that her Early Head Start home visitor was a central influence supporting her through the challenges that threatened to derail her as she struggled to obtain her degree. This paper describes the home visitor's pivotal role helping Andreya achieve her goal of a high school diploma.

Before Early Head Start

Andreya was 17 and in the second semester of 11th grade when she discovered that she was pregnant. She'd always adored babies and now she was in love with William, a man 11 years her senior. Secretly, she'd actually wanted to get pregnant. After all, her friends had been asking her for years why she was putting off having a baby. Still, when the pregnancy test registered positive, she was terrified – mostly because she anticipated her mother's disappointment and anger. "It was like, how can I tell my mama? She was like, 'Well I got plans for you and you got dreams.'" She thought about how her mother would have felt at the high school graduation that now might not happen: "I'll be the first to graduate out of my mother's three, and she'll be happy for me and, you know, I made her satisfied; she proud of me. I thinkin' like that." Her voice dropping, Andreya recalls, "It's like when I got pregnant, seemed like I let everybody down."

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[1] All names are fictitious.

[2] Job Corps is a federally funded program that provides high school education plus job training. To earn the high school degree, students must complete all high school requirements plus all requirements for their "trade" – the job-specific training.

She tried to continue going to school, but morning sickness and doctor's appointments added up to a lot of missed days. Finally, Andreya told the school counselor that she was pregnant. The counselor strongly recommended that she transfer to Stanton School. Andreya refers to it as "the pregnant school". It was a change for the worse. She had to take two buses, and sometimes the second bus had come and gone before the first one arrived at the transfer spot. But even more importantly, the classes didn't seem serious. She was taking 11th and 12th grade English and math, but the rest of the time was spent learning about parenting and money management. "Like I told my mama, that's not no kind of school." She dropped out. She figured that a year after her baby was born, she would return to school to earn bona fide high school degree. She didn't want just a GED.

She named the baby "Lavell" and loved him hugely. At first, William came over daily. As devoted as she was to her child and to William, however, Andreya felt cooped up. "It was just like William wanted me *not* to go back to school. He wanted me to always wait on him, depend on him." Plus, William's visits were becoming more and more irregular. Many evenings she didn't know where he was. "It was just like, if I wait here to wait on him, I'm gonna lose out a long life. I knew I wasn't gonna get nowhere without a education."

As the months wore on, other problems cropped up or became magnified. Lavell, it turned out, was seriously asthmatic. Andreya often found herself at the hospital. She feared he might die. She begged her mother to stop smoking in the living room because she was sure the cigarette smoke exacerbated the child's breathing problems. Her mother wouldn't stop. Andreya started staying in her bedroom with the infant, towels pressed under the door so the smoke couldn't enter.

That wasn't the only reason she was hiding in her room. Her younger brother, Tony, and her cousin who lived with them, Kalia, were teenagers and "they think they know *everything*. Can't tell 'em nothing. There's always arguin' in the house about something." Moreover, her mother, she thought, was very unfair, blaming her for things she hadn't done and making her do more than her fair share of chores. Deep down, of course, she understood why her mother had such a short fuse – Patricia was exhausted from her night job as a grocery store cashier, and her sons were breaking her heart. Quintus, Andreya's older brother, had just been sentenced to a 6-year term for drug dealing. It was almost a relief to have him off the streets – in the past couple of years he'd been hospitalized twice after serious fights. It seemed Tony was set to follow in his footsteps. He'd been suspended from school for assaulting a teacher, and it wasn't clear where he was getting the money he was spending on CDs and expensive shoes.

As if all this weren't enough, Lavell was turning out to be a handful. He'd always been very active, afraid of little, and more than typically tolerant of pain. Now, as he grew into a "busybody" toddler, he was getting into everything and being more than a little aggressive. The steroids prescribed to control his asthma seemed to make matters worse. Andreya described him as "hyper" and uncontrollable after every dose. Some of the arguments in the house were over disciplinary strategies. Andreya didn't think her brother and mother should hit him so much.

The time came to make concrete plans to return to school. Andreya thought back to her elementary school years, which she had enjoyed, and then to her middle school, junior high school, and high school years, which she had not enjoyed. Her school stories starting with sixth grade feature teachers who "disrespected" her and cared little about real learning. (Her school district is in fact known for its history of poor quality). Nevertheless, finishing high school was important to her, not just for the sake of making her mother proud, but even more critically, so that she could get a steady job that would allow her to take care of herself and Lavell. She decided Job Corps would be the right choice; she could get a high school diploma plus training for a job as a certified nursing aide (CNA). At the Job Corps orientation, she told the counselor that she was very serious about getting a degree but that her son occasionally had life-threatening asthma attacks so she might have to be absent some days. Going back to school meant that she had to find child care. Lollipop Land seemed good.

The Early Head Start Years

It was soon after she'd arranged everything so she could attend Job Corps that Andreya found out about Early Head Start. The program was recruiting at a required meeting for Temporary Assistance for Needy Families (TANF) recipients about the new welfare reform rules. While standing in line to sign in, she was approached by Rickie, an Early Head Start home visitor. "How you doin'?" he asked. She answered that she was fine. "What's your name?" he asked. She didn't know many White men, but he seemed nice, so she told him her name. "That's a cute name," he noted. "Have you heard about Early Head Start?" "No," she answered. "Are you interested in early childhood?" he asked. Of course she was. "And he was like, 'Is it OK if I come do home visits?'" She said, "I don't mind." She thought she knew a lot about children from having babysat for seven years, but she also figured there was a lot more to know. Maybe he could help her learn how to handle Lavell better.

Rickie came over a week later for the first home visit. They chatted as he helped her prepare dinner. Watching a man cook put her in a very good mood. It was so odd yet so wonderful that she couldn't help laughing. She told him about her life–about the fact that she was "a dedicated mother" and a "homebody," about her strong desire to move into her own apartment so she could get away from the conflicts with her mother and younger brother and cousin, and about her plans to return to school. Over the course of the next several months of weekly home visits, they established a warm relationship. He understood that he should go easy, never pushing her to talk but being ready when she was ready. As she opened up, he was charmed by her sincerity and insightfulness, by her great love for Lavell, and by how appreciative she was of the child development ideas and explanations he shared. She was so open to new ideas, so reflective and willing to reexamine habitual ways of doing things.

She started telling him about interactions she'd had with people who "disrespected" her. In Andreya's stories Rickie heard about real wrongs, but he also thought her tendency to react strongly to every slight was counterproductive. He thought she would be happier and more successful if she could control her temper, let some things go, and speak politely even to people who upset her – especially if they were people in positions of authority. It would also help her as a mother.

As was characteristic of him, he approached the issue directly and with humor. "You know," Andreya told us one day, "I used to get an attitude about everything, the way people do me, the way they talk to me and I actually would go off on you." Quoting Rickie, she explained how he'd helped her see a better way. "Andreya," he'd told her, "I'm not trying to be in your business but you need to just let it *ride* sometimes; let it *go*." Smiling, she recalled how she started to get mad at his comment. "And then I kind of *eased* up off of it. He's like, 'See, you about to get mad at me, wasn't you?!' I *was*! I was. I was about to tell him off and it's like, hold your tongue, Andreya. And he's like, 'Just *cope* with it.' He said, 'You need to just lighten up a little bit.' And I started doin' that." Sometimes Rickie used teasing to check on how she was doing. "Have you got in any fights at school?" he asked her one day. "And I was like, '*Nooo*!' And he's like, 'Are you sure?' I'm like, 'Yeah! Why you ask me that?' He said, 'Because you got a *baaad* attitude.'"

Going to school was very, very difficult. Just getting there on time was a challenge. William had told her he would give her a ride every morning, but many days he didn't show up. That meant she had to take one bus to the child care center to drop Lavell off, then two more to get to Job Corps. Sometimes, even though she managed to get to the child care center on time, it was hard to leave in time for the next bus because Lavell would cry when he realized she was about to go. She took to waiting until he was focused on a toy or activity, and then sneaking out.

In addition, it was hard to keep up with all the assignments. Though Andreya loved reading to Lavell and she enjoyed magazines such as *Jet*, the reading level of the school books was higher. "It's kinda hard. The books be this thick and there be five of them. And it's a whole bunch of work. You gotta do the chapter, remember all the stuff and then turn around and take a test. Some of the stuff you do forget 'cause it's a lot of stuff. It's like chapters, and it goes all the way to number 53, one of 'em. Turn around-take a test. If you miss it you have to pay for your next one." To make matters worse, for several months the school could not provide books for everyone and students were not allowed to use the photocopying machine.

Coping with schoolwork on top of the demands of caring for an active and often-sick child (not to mention her unhappy interactions with her mother and brother and her growing anxiety about William's on-and-off attentiveness) made her exhausted. "I'm working my tail off," she told us after detailing her daily routine of rising early, dressing, readying a reluctant Lavell for child care, rushing to be on time to school, running to pick Lavell up in the afternoon, making time to play with him at home, doing the housework her mother required, completing school work, and getting Lavell's things prepared for the next day. Some days studying in the evening when she was so tired gave her migraines.

Then there were all the forms she needed to fill out on time so that she could keep Lavell in child care and get the public and charity assistance she so needed. Without a car and with full days committed to Job Corps and Lavell, it was hard to get to the places where she needed to go to make the proper applications. Rickie stepped in to help. When Lollipop Land required a health form signed by a doctor, he dropped by the community health center and picked it up, saving her from having to miss hours at school. When he learned of assistance for which he thought she would qualify, he did what he could (including giving her rides) so that she could apply.

Her teachers and counselors at Job Corps, on the other hand, were not very helpful. There was one teacher who urged students to ask for help when they needed it, but when Andreya asked for additional explanation, the teacher was likely to tell her to wait and she'd get back to her. Then she would forget. Andreya understood that the teacher was overworked with too many students, but a lot of the material was hard for her, and she really needed some assistance. One time when she got stuck she asked a student who was a chapter ahead of her for help. The teacher told her not to talk during class.

What made things most difficult, however, was that the Job Corps faculty really didn't seem to understand what it meant to have an asthmatic child. Andreya didn't like to miss school, but sometimes she didn't have a choice – she had to take Lavell to the hospital. She had a breathing machine for him at home, so she only took Lavell in when it was a true emergency.

Unfortunately, that was fairly often. Sometimes while in class she would get a note from the office that someone from the child care center had called to say Lavell was having trouble breathing. When that happened, she ran out of the school as fast as she could. She didn't always stop to tell someone where she was going. One day the director called her to the office to talk about her attendance. The school counselor, Ms. Moore, was also present. She started the conversation in a sarcastic tone of voice. "It's really starting to be a bother because it's like every week you're at the hospital. This is like an everyday thing for you, huh?" Andreya tried to explain, "I said, 'Well if I could stop my son from getting sick, I would. You know, my son has asthma.'" The director told her she should find a family member who could take him to the doctor so she could come to school whether or not he was ill. "It's not that easy," Andreya told her. Her mother could take him some days, but not always, and all her aunties worked during the day. There really was no one else who could take him.

A few comments later, Andreya realized that the director and the counselor didn't understand what a child's asthma means to a mother. "I said, Wait a minute. When I first started Job Corps and I was just in orientation, I made it clear to everybody that the only reason why I wasn't going to be here if I had some important business to take care of or if my son is sick. I cannot stop him from getting sick. I can give him all the medicine in America – that don't mean he going to be well. My son's life is nothing to play with, and when they say his asthma is acting up, I'm running. What I supposed to do? I supposed to be, 'Oh while I was at school, my son died.' No. 'I was waiting on my counselor to give me a pass and my son died.' No."

Ms. Moore interjected, "'Andreya, girl, you act like you're real upset.' I said, 'I am.' I took like a deep breath, and I said, 'I'm going to tell you something.' I said, 'My son is more important than Job Corps could ever be to me in life.' I said, ' I can always come back to school, but I can't always have a son like the one I got. Can't nobody give me back the same little boy I had at first.' And she's, 'Well, you really...,' I said, 'No, wait a minute, listen to me,' I said, 'And you don't think me staying up; running back and forth to the hospital and they keep telling you the same old thing, but every time you take your son home, it get worser and worser; you don't know when you fall asleep, you don't know if he's going to stop breathing in his sleep.'" She got up to leave. At the door, she turned around. "'Job Corps will play a big part in my life. I'm not going to say it's not, but my son plays a more bigger role in my life than anything. I know I need my education. But right now my son, he's my first and main priority. I can't be here when he's sick. That's all.' And I just walked out."

There were many days when she seriously considered dropping out. Rickie talked her out of it. When she brought up the possibility of calling it quits, he reminded her how big the stakes were. After each home visit, she would resolve to stick it out.

Andreya was 19 and Lavell was 20 months old when she realized she was pregnant again. Out of loneliness and wishful thinking that the relationship was righting itself, she'd succumbed again to William's overtures. Like the first time, more than anything, she was afraid to tell her mother. Maybe she should take Lavell with her and move to another state. Deeply distressed, she asked Rickie what he thought she should do. Rickie offered four pieces of advice: (a) she should tell her mother right away because she was probably hurting her more by not telling her than she would be if she told her the truth. Her mother no doubt knew but was waiting to hear it from her; (b) She shouldn't move away because there were too many people in town who loved her, even if she couldn't see it now, and she needed their support; (c) She should keep going to Job Corps because she really needed her education; and (d) She should carefully examine her willingness to be with William. Did she really think he'd be there for her in a year? In two years? In four?

That evening, Andreya confessed to her mother, "I'm pregnant." To her surprise, her mother's reaction was nothing like her reaction had been to the first pregnancy. "You went back to school which I didn't think you was gonna go back to school," she said. "You in a job training that guarantees you a job. So I ain't mad at ya'."

She returned to school three months after Keon was born. The baby's illnesses (he too was asthmatic) made it impossible to return after two months, as she'd planned, but at least she hadn't taken the full six months Job Corps allowed. She'd actually finished the requirements for the high school diploma before she'd had Keon. She'd wanted so much to graduate then, but the rules were that you had to finish both the high school requirements and "the trade" (CNA requirements, in her case), before you could get your diploma. So now she took CNA classes.

As before, going to school was very hard – harder, actually, now that she had *two* frequently ill children. Twice in one month Keon was diagnosed with pneumonia. That was on top of both boys' asthma attacks. Even when both children were healthy, mornings were a scramble getting them to child care and herself to Job Corps on time. Every school morning she'd wake up at 5:30 and quickly get herself ready. Then she'd change and dress Keon and give him a bottle so he wouldn't be fussy before he was fed at the child care center. At 6:00 she'd wake Lavell up. Often he was sleepy and didn't want to get up; she'd have to struggle with him. Then she'd fill the diaper bag with bottles and baby food and give Lavell breakfast. Some days she was so tired she could hardly keep her eyes open.

Evenings were also hectic. Rickie once commented to us that he couldn't imagine coming home to all the hubbub in that house and having to get children fed and settled down. (The hubbub was from Tony and Patricia and their various friends and relatives.) Andreya didn't have a choice. Every weekday she'd come home, prepare and eat dinner, feed the children, wash dishes and mop the kitchen floor, wash soiled clothes, pack clothing changes and diapers for the boys to have at the center the next day, watch some TV, study, read to the boys and play with them, and put them to bed. Lavell's bedtime was unpredictable–if he hadn't slept during naptime that day, he'd be ready for bed at 7:00. If he had slept, it might be 10:00.

Frequently she stayed up until 1:00 a.m. finishing chores and catching a few moments to herself. Rickie suggested ways to manage her evenings so she could get the sleep she needed. He brought her some recipes for quick dinners. Simplifying meal preparation and cleanup would surely help. She agreed that setting an earlier bedtime for herself should be a goal. Rickie had taught her the value of short-term, attainable, "everyday" goals. Before, she used to set herself grand goals and then never meet them.

She felt like she deserved some acknowledgment at school for the fact that she was "running here, running there, don't hardly get no sleep." Instead, she said, her counselor and the teachers "had an attitude" toward her. They wouldn't believe her when she told them that the buses weren't following their posted schedules – not until the counselor called the bus company and found out it was true. Worse, yet, they still didn't understand her situation as the mother of two asthmatic children. There were even financial repercussions. Bus tokens were given out first thing in the morning on Wednesdays. If she was late or absent on a Wednesday because either she or one of her children was sick, she didn't get her tokens at all. She couldn't understand why they wouldn't hold her tokens for her.

Then things came to a head. One morning Andreya woke up to Lavell's heavy wheezing and high fever. She called Job Corps to say she'd have to miss school again. At the hospital, the diagnosis was asthma and bronchitis. They had just returned home when Ms. Moore knocked on the door. Andreya let her in. Ms. Moore told her she was about to give her five more penalty points and proceed with a meeting to have her expelled if it weren't true that Lavell was sick. Andreya gave her the hospital papers and showed her the tag around Lavell's wrist.

Both had that day's date on them. Ms. Moore seemed unconvinced; she continued talking about what she was going to do to have Andreya permanently dismissed for poor attendance.

Andreya looked Ms. Moore in the eye, "Well Ms. Moore, I ain't got no reason to lie and I wouldn't lie on my kid anyway if he wasn't sick." "When are you coming back to school?" Ms. Moore asked. "When my son get better," Andreya replied. And then she conveyed what she'd conveyed before: "I can always come back to Job Corps but I can't always have another son, not like this one. So therefore Job Corps ain't important to me right now."

Lavelle recovered and Andreya went back to school, but the staff's suspiciousness toward her weighed on her. Again she told Rickie she wanted to drop out. He asked if she'd mind if he called Ms. Moore. She told him to go ahead. We know that in the phone call he made the next day, he explained his role in Andreya's life, told Ms. Moore that it was absolutely true that Andreya's children suffered from fragile health, and assured her that Andreya was doing everything in her power to complete the CNA training–that she was serious about earning the diploma and was not making up excuses.

Suddenly (or so it seemed to Andreya), Ms. Moore started giving Andreya her bus tokens even if she couldn't come in on a Wednesday. She told her not to worry if she had to be at the hospital, and made efforts to buoy up her spirits. Andreya's account reflects her own commitment to school, her stress, and Ms. Moore's new support: "And I just keep on thinking about what it was gonna be like if I didn't get up and go to school everyday. It really irked me when my kids got sick and I couldn't go to school and it was like it put me more behind. And I felt like the more and more I try to go forward, I'm being pushed back, or I'm going in a circle and Ms. Moore was like, 'You need to stop putting yourself down like that. If you stop telling yourself that, you can get ahead.'"

The next time we saw Andreya, about five months later, she was the happiest we have ever seen her. She and the boys had moved into their own apartment, a two-story, two-bedroom townhouse in a clean, attractive new public housing project. She'd also graduated. Her description of graduation day stands out in its animation and joy. Because of all the missed days, it had taken a couple months longer than originally planned to complete all the CNA requirements. But she'd done it and she'd walked across that stage. She'd gotten her hair and nails done and worn her best dress and high heels. When her friends saw her, they'd teased, "We thought you was going to come to the graduation in some jeans and t-shirt!" She'd shot back, "Yeah, right! This is the NEW IMPROVED ANDREYA!!"

To our question, "Is your mother really proud?" Andreya nodded, "She is. That's all she tells me, 'I'm so proud of you and that day at graduation.'" Lavell was also proud. When he saw his mother approach the stage, he ran up, too. The two walked across hand-in-hand while the audience chuckled and cameras flashed. Everyone's excitement over his mother's accomplishment was infectious. "Lavell was happy hisself and he kept on saying, 'Mama, I love you! I love you, Mama!"

Reflections

In one of our conversations two years later, Andreya reminisced, "There's a lot of times I wanted to quit Job Corps, but Rickie talked me out of it." Looking back, we know that the barriers were huge. For sure, her mothers' and grandmother's unflinching pressure and support had served as positive motivators, yet they themselves were models of teenage motherhood and school failure. Many days, distress over her failing relationship with William, irritation with ongoing family conflict and noise at home, and worry over Lavell's behavior and both children's health made it more than difficult for her to study. Economic hardship exacerbated all of these problems by creating heightened tensions among all family members. Moreover, academic work just did not come easily to Andreya – a predictable fact given her family conditions and what we suspect about the quality of her prior schooling. Perhaps it was for these reasons that she was especially vulnerable to the hostility she initially perceived from her Job Corps counselor and teachers.

Andreya understood, as we did, that Rickie's contributions to her graduation went well beyond his words warning her of the consequences of dropping out. Over the two years she'd been in Early Head Start, he'd taught her how to manage her temper and her time, encouraged her to set and work toward attainable goals, helped her navigate the social service system, served as her advocate, bolstered her self-confidence when it flagged dangerously, and provided gentle advice regarding her relationships with her children, her mother, her brothers, and her children's father. All of these approaches had had direct or indirect impacts on her eventual success in becoming the only one in her family to graduate.

Andreya remembers once getting teary during a home visit. It was shortly before Lavell "aged-out" of Early Head Start. She was thinking how grateful she was to Rickie. Rickie noticed her eyes watering, and asked if something was bothering her. "I ain't never had nobody before who helped me out like this," she said quietly. His reply shared the credit with her, "Andreya, I help those who help themselves."

THE CHILD'S EXPERIENCE IN A MONTESSORI EARLY HEAD START PROGRAM

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Introduction

This paper illustrates the development of an approach to understanding program processes in a center-based Early Head Start (EHS) program using both quantitative and qualitative methods. The data we discuss here are derived from two studies that were pursued in parallel as part of our local research in the national evaluation of Early Head Start. The first was an inquiry into child responses to classroom environments using teacher reports, the second an ethnographic study of the Early Head Start classroom environments and the meaning of the same to families and children. These studies were developed as distinct approaches to understanding program processes, but we soon realized that there would be significant opportunity to focus our attention on common areas of concern as well. Although there are different ways to combine these approaches, here we will illustrate them through the use of case studies.

Understanding individual participant response to programs and services is increasingly recognized as an important aspect of study in early childhood intervention research (Emde, Korfmacher & Kubicek, 2000; Hauser-Cram, Warfield, Upshur & Weisner, 2000). Examining outcome differences between a treatment and comparison group provides only a narrow perspective on the value and meaning of program services for families and communities. It ignores the complexity of individual participant response to an intervention over time and avoids a consideration of factors within participants' histories, environments, and cultures that may mediate their response to the program. Similarly, outcome studies commonly treat the program as stable, with a lack of attention to features within the program that may change over time. Focusing on program processes and participant experience of these processes allows a greater understanding of the intervention as it exists in the daily life of families.

Typically, the parent is the gatekeeper to the family and the target of much of the intervention, so understandably most process research has focused on the parent's response to the program services (Emde et al., 2000). In most cases, however, young children are also participants in the intervention, and understanding their experience is also important. This is not often done, as measuring a child's experience and engagement in intervention services is difficult. Young children cannot be directly queried about the meaning they ascribe to program services, so their engagement must be inferred from their attention and behavior toward program activities and objectives. From the childcare literature (Howes & Smith, 1995; Ridley, McWilliam & Oates, 2000) we know that children vary in how they engage and respond to program practices and a center-based environment, but it remains a complex task to disentangle child maturation, initial temperament, and cognitive abilities from program response. Few studies have examined the young child's adaptation to a day care environment over time (see, for example, Fein, Gariboldi & Boni, 1993).

Qualitative or ethnographic methods are also possibilities for examining child program experience. While there are some reports in the literature using qualitative data to explore the meaning of interventions to parents and program staff (Gilkerson & Stott, 1998; Nauta & Hewett, 1988), these approaches have generally not been used to explore the same issues for children, in no small part because qualitative researchers tend to rely on interview data, which cannot be collected from infants and toddlers. Yet, the strengths of qualitative approaches in exploring the core issues of meaning and experience are well recognized. Calls for combining the two approaches are increasingly heard in the field of preventive and early childhood intervention (Hauser-Cram et al., 2000; Freel, 1996; NIMH, 1993).

A Montessori Early Head Start Program

Family Star is a full-day, center-based EHS program that uses a Montessori curriculum modified for the cultural make-up of the community it serves, a largely Hispanic neighborhood in Northwest Denver. The program is directed towards promoting child individuality, social competence, practical and intellectual skills, and a curiosity in learning in an environment that emphasizes safety and appropriate opportunities for experiencing sensory stimulation and activity. By structuring the child's classroom environment, and by promoting attention and interest in activities and materials, the program hopes to provide a sense of self-direction in children that will then be taken into the life of the family. In this sense, the child becomes the gatekeeper for promotion of strengths, which makes the experience of the child in the classroom central to understanding the value of the program to participating families.

At the beginning of our research, there were two kinds of program classrooms: Infant classrooms, known as Nidos (nests), and toddler environments, known as Infant Communities (ICs). Throughout the period of our research, the program experimented with various models and new classroom configurations. Among these was a non-transitioning "Organic" classroom, which started as a Nido and then, as the children aged, became an IC. Also developed was a Bridge Program, which is intended to introduce older children (approximately 30-36 months) to more advanced Montessori materials. There were three Nidos and three ICs when the program opened in 1997. A fourth IC was soon added to accommodate additional children, and one of the original three Nidos was the organic classroom, which became an IC as the children there became toddlers. The Bridge program, when it opened, became the 8th classroom. Thus, at the conclusion of our research with the program, there were two Nidos, five ICs, and the Bridge program. With the exception of the children in the organic classroom, who did not transition to a new classroom, the children made at least one transition (from the Nido to the IC) during their time in the program. Many children also made a transition from the IC to the Bridge program.

Child Program Experience

Two methods were used to examine the child's experience. Teachers in the classrooms completed weekly rating forms that assessed their perspective on the child's reaction to the classroom environment, including physical materials, adults, and peers. In addition, an ethnographer (Dr. Spicer) made observations of the classroom on a regular basis and visited select families in their homes to discuss their thoughts about the program in more detail.

Teacher Rating Forms

Classroom teachers completed a report of the child's experience in the classroom. We identified activities, behaviors, and events used by teachers to track a child's engagement in the classroom. Items were adapted from the Infant Behavior Questionnaire (Rothbart, 1981), a measure of child temperament. Additionally, program staff communicated to us the importance of opportunities in early morning and late afternoon for teachers to communicate with parents about the child's experience and help bring Montessori principles into the home. For this reason, five items were created to measure the parent's interaction with the teachers (e.g., "How much did you talk to the child's parent(s) at the end of the day?"). In the final version, teachers rated each child on 26 items using a seven-point scale once a week for a particular day, varying from week to week. If a teacher did not see the child in the situation described in the item, they coded the item as not applicable.

To assist in data reduction, factor analysis was used as a tool to explore how initial groupings of the items (based on discussions with program staff) fit with patterns of responses.

Six major factors were identified, accounting for 68 percent of the variance. Reviewing items that loaded on these factors, five logically-derived subscales were developed that seemed to capture well the beliefs and ideas that emerged from the initial discussions with teachers and program directors:

1) Positive Classroom Engagement (7 items): Child orientation and attention to objects, sense of pleasure in activities, and positive social interactions with peers.
2) Distress & Upset (4 items): Child crying and fussing during transition times or daily routines, such as eating, toileting, and napping.
3) Tantrum & Fighting (4 items): Strongly adverse reactions when limits were set or when interacting with peers.
4) Child seeks help (3 items): Child use of teacher for comfort, help, or company
5) Parent Seeks Help (5 items): Parent request assistance about child's behavior or development.

Children varied considerably in the number of individual ratings that they had over their participation in the program, since their level of participation in the program varied. Although the average level of participation was 22 months, this could range from 0 days (for children randomized into the program but whose families elected not to continue participation) to 34 months (for children who entered the classroom at 2 months of age).

On average, each child received approximately 54 ratings over time from their teachers. For the illustrative purposes of this paper, we selected children who had at least 60 ratings, or approximately two a month for their time in the program. From this group, we selected two children on whom we also had substantial data from our ethnographic work. Given the highly selected nature of this sample, it is important to emphasize that data from these children may not represent average or modal data from participants in the EHS program. The cases have been selected for discussion in this paper because they demonstrate some of the kinds of responses that children can show to this program and because they illustrate the possibilities of combining qualitative and quantitative data to understand services for infants and toddlers.

Ethnographic Methodology

There were two principal components to the ethnographic research reported here: (a) extensive participant-observation in the classroom environments, and (b) detailed case studies on the impact of the program on 12 families. We had two main goals in designing this ethnographic research: First, we wanted to understand the program's Montessori intervention as it was actually delivered and, second, we wanted to know what the intervention meant to parents and children living in poverty.

Participant-observation in the classrooms of the Montessori Early Head Start Program began when the program opened in early 1997 and continued through the end of 2000, when the majority of children had moved on to other programs. Over the first year of the research, the ethnographer would regularly spend one morning and one afternoon in each classroom before moving on to another classroom. In the second year, these observations were scaled back to one morning in each classroom. The focus of the participant-observation work in the classroom was on the child's experience of the Montessori curriculum as it was implemented in particular classrooms.

The ethnographic case studies component of the research was designed to more fully illuminate the families' experiences of the intervention and especially the ways in which the Montessori intervention had been brought to their homes (either through the child bringing home behaviors learned from the classroom, or through family members absorbing information through contact with staff). Families were recruited directly by the ethnographer based on his familiarity with them and their children from his participant-observation work. Participating families were visited three times over their child's second year of attendance at the program. The home visits that formed the basis for these case studies were fairly open and unstructured, although all of them involved some discussion of the child's development, family life, and their experience with the program. These visits were audiotaped and the ethnographer made detailed notes on the topics and themes that emerged during each visit.

Case Studies

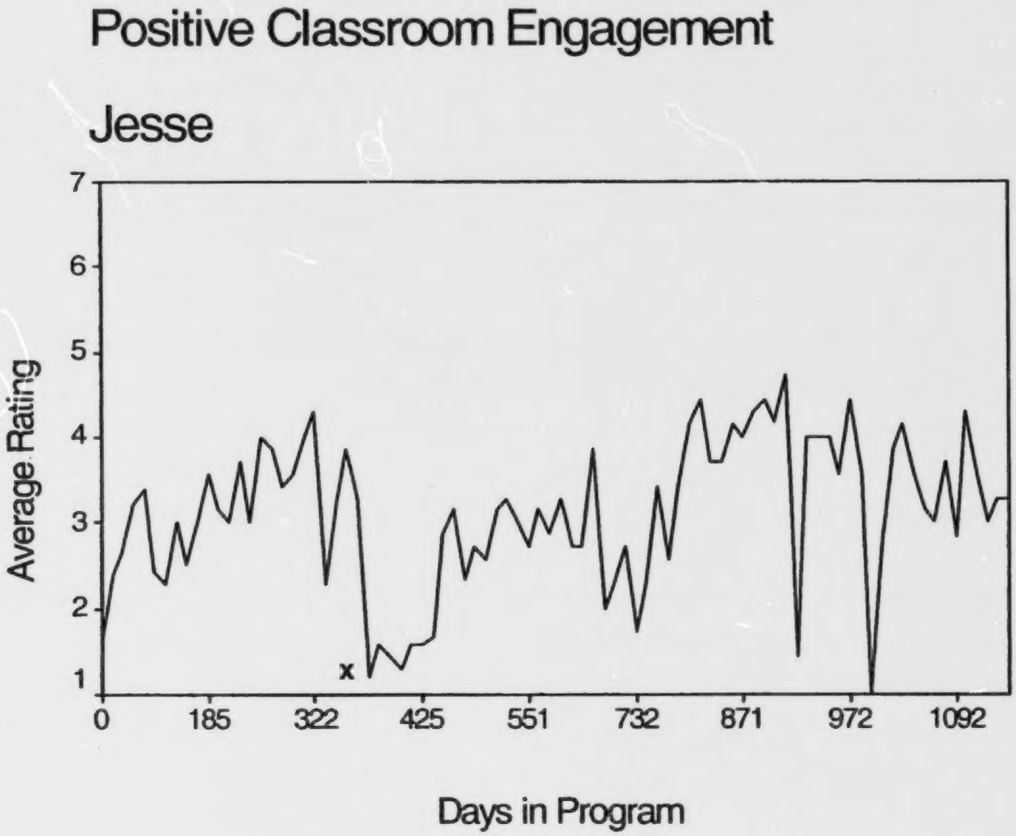
As we have already noted, the two components of research on program process discussed here—quantitative ratings of child and family experiences and ethnographic research on the same—were pursued somewhat independently of each other, but the shared focus on program process and the experience of the intervention permits us to combine data in several ways. For this paper, we present the data at the level of individual cases, using two children from the subset of 12 families that were included in the ethnographic case studies.

To protect the confidentiality of these two cases, we have assigned them the pseudonyms of Jesse and Peter. Jesse and Peter began in the same Nido, but transitioned to different IC classrooms. Our presentation strategy in each of these areas is to first present data from the teacher ratings of these children and then to present data from the ethnographic work, in both the classrooms and in the home visits, that aids in our interpretation of the quantitative findings. We have deliberately selected examples where our ethnographic work would illuminate the patterns seen in the quantitative data.

Positive Classroom Engagement

Figure 1 shows teacher ratings of Jesse's attention and orientation to classroom materials and positive interaction with peers over time. What is evident is a generally positive trend in Jesse's ratings on this dimension, suggesting a gradual increase in his engagement with the

FIGURE 1



x = transition point

classroom environment. His upward trajectory, however, is punctuated by a sharp drop at his transition from the Nido to the IC, noted by the "x" on the graph, which is followed by a rebound and continued improvement in ratings. This pattern suggests that moving to a new classroom was difficult for Jesse, but that the difficulties were transient.

Several aspects of this quantitative data gain support in our ethnographic work. Our participant-observation work in the EHS program's classrooms underscored for us generally the significance of the classroom transition in children's experience with the intervention. While not always a disruptive influence on children, it was one of the most significant changes they would encounter in their time in the program, despite the careful and gradual procedure program staff developed for introducing the children to their new environments. When we began to observe patterns in the teacher ratings such as those evident in these graphs, we were confident that these reflected real changes in the child's reaction to their new environments, rather than simply being an artifact of the shift to a new rater (an alternate possibility we considered).

Indeed, as one of the first and youngest children in his Nido, Jesse was a favorite of the classroom staff there and was generally greeted with a great deal of enthusiasm when dropped off in the morning. Jesse did not enjoy the same amount of enthusiasm among the staff in the IC—a fact that was evident not only in our classroom observations, but also in comments his parents made to the ethnographer in his conversations with them. Our observations in Jesse's IC and our conversations with his parents suggest that the transition to the IC marked a loss of the special attention he had been receiving in the Nido. Thus, it is not surprising to us to see that the transition to the IC was somewhat stressful to him. Our subsequent observations of him in the new classroom indicate that he was eventually able to adjust well to his new surroundings after this initial stress, but as we shall see, there were some important differences in his adaptation to the new environment.

Negative Emotions, Tantrums, and Fighting

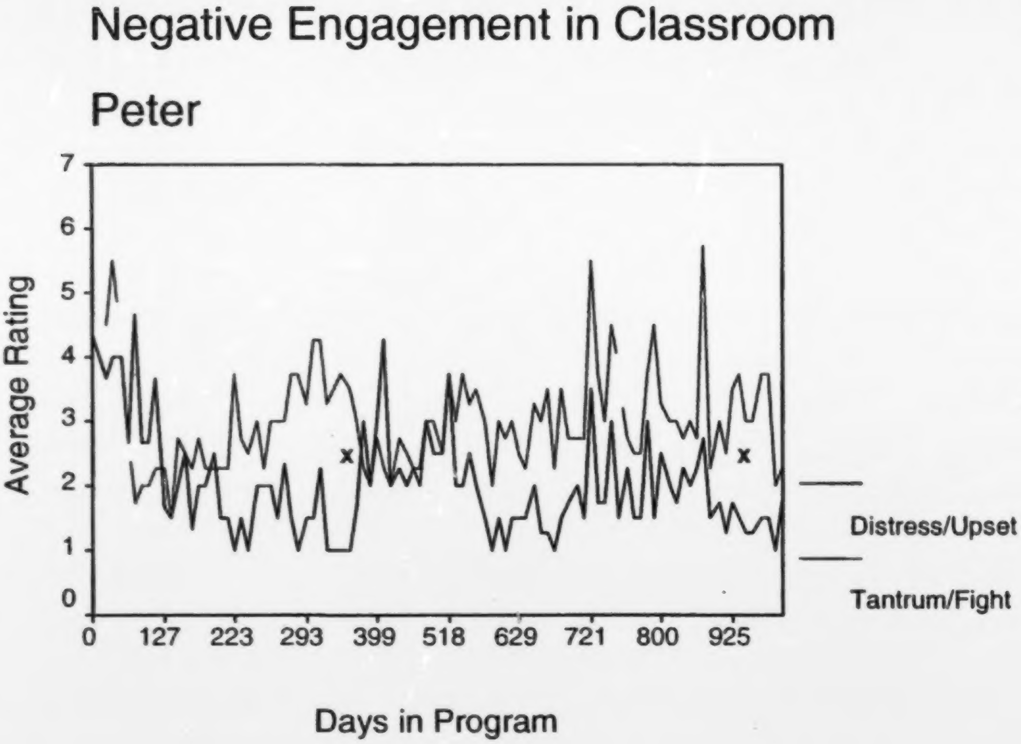
To illustrate the more negative dimensions of distress/upset and tantrum/fighting, we use a graph from Peter, who shows an interesting pattern in his negative emotional responses to the classroom (see Figure 2). The picture of Peter that emerges from these graphs is of a more challenging child whose expressions of negative affect did not significantly decrease over time, as one might have been hoped.

Teacher management of negative affect and aggressive behavior is a major focus of this center-based EHS program, which emphasizes the use of gentle verbal control of children wherever possible and the redirection of children's attention when conflicts develop over the use of particular materials. However, our ethnographic work in the classrooms made clear that certain children did not respond well to these more subtle techniques, challenging the teacher's capacity to control them and maintain an orderly environment for the other children. And our ethnographic observations with Peter, both in the classrooms and in his home, suggest that, indeed, this was the case with him. He showed a tendency toward aggression with other children in the classroom (and his siblings in the home) and he would often react negatively when frustrated. Throughout our research, Peter remained a somewhat challenging child—both for his mother and for classroom staff—and this appears to be reflected in his teacher's ratings of his behavior.

Child Seeks Help

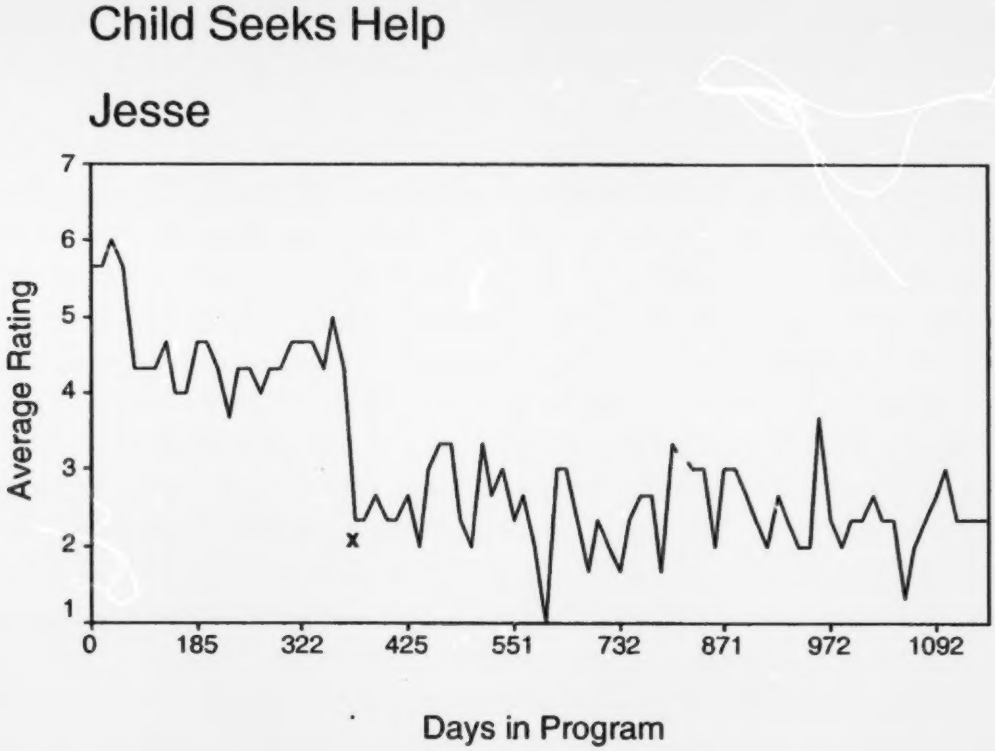
Figure 3, which plots Jesse's use of his teachers, illustrates one pattern of how children in this program use their classroom teacher for guidance and emotional support. There is evidence

FIGURE 2



x = transition point

FIGURE 3



x = transition point

917

that Jesse was developing independence in the Nido classroom, but the graph also suggests that Jesse appears to have used his IC teacher for help or comfort much less than he had used his Nido teacher. As we have already noted, our ethnographic work underscores the special relationship that Jesse had with the staff in his Nido, which did not continue in his relationships with the IC staff. In part, this appears to explain the difference in Jesse's use of his teachers between the Nido and the IC.

But it is also important to note that the loss of Jesse's special relationship with the teachers of his Nido was not necessarily a bad thing from the perspective of his developing independence. Indeed, some program staff expressed concerns that the affection of Nido staff toward Jesse kept them from encouraging his independence to the extent emphasized by the program's Montessori model. Thus, it may well be the case that Jesse's decreasing reliance on his IC teachers was a desirable outcome of the program and may, in fact, have been facilitated by his relatively more distant relationship with the teachers of his IC. While we cannot be sure to what extent Jesse's decreased reliance on his teachers in the IC was a function of normal development (no single case could demonstrate what is normative in this context), our ethnographic work in the program and with Jesse's family underscores the extent to which the patterns evident in the ratings of Jesse's classroom behavior may make sense in the context of the program's approach to encouraging independence.

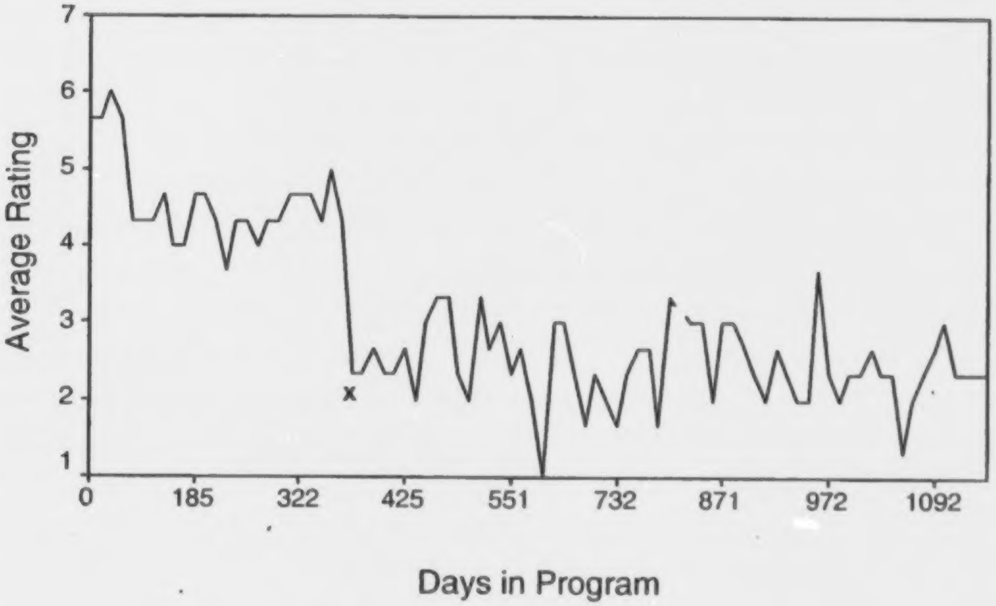
Parent Seeks Help

Figure 4 documents parents' use of teacher for Peter. Notable are abrupt shifts upward at her child's transition from the Nido to the IC and downward when he moves from the IC to the Bridge. Thus, it appears that Peter's mother felt more comfortable seeking out the IC teacher for guidance and support about Peter's development.

Child Seeks Help

FIGURE 4

Jesse



x = transition point

Our ethnographic work in Peter's classrooms confirms that Peter's mother spent more time in his IC visiting with the teacher than in the other two classroom environments.

Furthermore, observations of actual interactions between the two suggest that communication between them was generally quite easy and comfortable. In contrast, the relationship between Peter's mother and Nido staff, while not unpleasant, was definitely more guarded and strained. Further confirmation that this was the case comes from one of our ethnographic home visits, when Peter's mother declared that she felt she could talk to his IC teacher about virtually anything—an opinion which she did not express about the teachers in either of his other two environments.

Discussion

The cases presented demonstrate the way different children experience a high-quality, theoretically-driven early childhood environment. There is an expectation in the program model's theory of change that children will show increased orientation and attention to their environment, ability to work independently on developmentally-appropriate activities, and better affect regulation (shown in particular by decreases in child distress and upset during daily transitions and routines). While one of the children presented here does show this pattern, the other child does not, suggesting that our complementary data-gathering approaches may well be capturing meaningful variations in child experience of this Montessori program.

Examining individual cases highlights aspects of experience that deserve further attention. One example is the importance of transitions between classrooms for children, such as the move from the infant to the toddler classrooms. Marked (if temporary) decreases in the child's classroom engagement were often observed by both the teachers and the ethnographer. Our combined data also helped us to appreciate that these transitions can have a significant impact not only on children but parents as well, who can develop special relationships with one set of classroom staff that are not easily transferred to the staff of a new classroom.

Both approaches to data collection described here relied on different forms of observation. Collecting data from teachers offered a unique and powerful way of following children over many different points in time from the perspective of observers who knew the children in-depth, creating running records of child progress. But teacher ratings exist in the context of program philosophy, values, and daily operations, which would be largely unarticulated without concurrent ethnographic work. The value of ethnographic observation is that this context can be explored, to gain greater understanding of how it influences the ratings and the child's response to the program environment.

It is important not to over-interpret these unfolding snapshots of the children's lives in the program. It can be difficult to disentangle program effects from other influences, such as normative child maturation in these skills, or environmental or life circumstances outside of the program. Viewing results from classroom ratings and observations in the context of the outcome evaluation—including independent observations of the child's abilities and behaviors conducted both in home and laboratory settings—will be critically important in interpreting the meaning of children's trajectories.

Linking analyses of program process to outcome data will inevitably involve aggregation, moving beyond the level of the individual child to look at children's experiences in the classroom environments more generally. The cases discussed here, however, detail some of the ways that ethnographic and quantitative report data can be used to tell more satisfying stories about children's experiences of an intervention than would otherwise be the case using a single method alone. As such, these cases illustrate the very real promise of a multimethod approach to the understanding of program process.

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BEVERAGE, FRUIT AND VEGETABLE INTAKES BY EARLY HEAD START-ELIGIBLE MOTHERS AND THEIR CHILDREN

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The nutritional quality of foods served to children in Early Head Start (EHS) center programs can readily be assessed and regulated. However, in home-based programs oversight of nutritional quality is more difficult for several reasons. For example, home visiting programs tend to focus on the quality of the mother-child relationship, and not how to make healthy food choices. Nevertheless, weekly visits by EHS staff could affect diet quality, because mealtimes are a key opportunity for mother-child exchanges.

Good health and adequate food intake is crucial for normal physical and cognitive development of all children under three years of age, but low-income families are at high risk for poor nutritional status (Ruston & Kirk, 1996). Foods of special concern to the health status of Early Head Start families are beverages, fruits and vegetables. Milk is especially important as the main source of calcium for children's development and for mothers to reduce risk of osteoporosis. Because soda often replaces milk as a beverage, soda can negatively affect nutritional status (Ballew, Kuester & Gillsepie, 2000; Harnack, Stang & Story, 1999). Soft drink consumption has dramatically increased in the last decade and is thought to be one of the factors associated with development of obesity. Likewise, fruit juice, although a good source of vitamin C, can also be easily over-consumed, because of its sweet taste and convenience. High intakes of fruit juice can lead to diarrhea in young children and sometimes juice replaces milk consumption.

Health professionals promote the increased intakes of fruits and vegetables because of the inhibitory effects on chronic diseases like diabetes, stroke, obesity and some cancers (Steinmetz,

& Potter, 1996). Perhaps due to limited money for foods and lack of knowledge, limited income families eat less fruits and vegetables compared to middle and high-income families (Anderson, Bybee, & Brown, 2001). In Michigan only 26 percent of women with income less than $10,000 reported eating the recommended five servings of fruits and vegetables a day (Michigan Department of Community Health, 1999).

By three years of age, children usually eat meals and regular foods with their families. Children's behaviors are determined in part by modeling the behaviors of adults. For this reason, and because diet quality is crucial for good health, we examined the diet quality of the EHS research project families and their controls. Two aspects are reported here: (a) the beverage consumption of mothers and their toddlers, and (b) the fruit and vegetable consumption and intentions of mothers.

The participants were 148 mother-child pairs from a medium size city in Michigan who were eligible for Early Head Start. Interviewers obtained 24-hour dietary recalls of each mother and toddler by interviewing the mothers using the USDA multiple pass method. Heights and weights were self-reported by mothers. Interviews took around one to two hours and mothers were paid $20.00 for each interview. Dietary data were entered into Nutritionist Pro (software from Food Bank, 2001) to assess nutrient intakes and servings of food from the USDA Food Guide Pyramid food groups. Amounts of beverages were determined including milk, 100 percent fruit juice and soft drinks. SPSS (Statistical Package for the Social Sciences, Version 10.0) was used for statistical analyses.

Eighty mother-toddler pairs were in the EHS program group and 68 pairs were in the control group. Because there were no differences between groups for food intake, data were combined. Around 77 percent of mothers were Caucasian American, 15 percent African American and the remainder were from other ethnic groups such as Hispanic, Native American, Vietnamese and

Biracial. About 70 percent of mothers reported that the food intake on the day they were interviewed represented their usual meals and snacks. This was 76 percent for their toddlers. Around 30 percent of mothers and 39 percent of toddlers used dietary supplements. The average Body Mass Index (BMI= kg/m2) of mothers was 27.2; with 26 percent overweight (BMI 25-29.9) and 33 percent obese (BMI-30).

Mothers drank twice as much soda as milk (25 fl oz vs. 12 fl oz, respectively). Around 70 percent of mothers drank 8 fl oz soda compared to 39 percent of mothers who drank 8 fl oz milk, equal to one serving from the dairy group. Whole milk was consumed most frequently. Sixty-two toddlers drank 100 percent fruit juice (12-11 fl oz) and 22 consumed 12 fl oz, which is the level of excess intake according to the American Academy of Pediatrics. Most all toddlers (n = 133) drank milk (14-11 fl oz), and 45 also drank soda (8-5 fl oz).

Findings from three prior interviews (baseline, 14, and 24 months) showed a low incidence of mothers or toddlers consuming even one serving of fruits or vegetables. For example, at 24 months, only 39 percent of mothers consumed one serving of fruit and 70 percent consumed a serving of vegetables, including fried potatoes. At 36 months, 87 percent of mothers answered that eating fruits and vegetables was very important for their health, but only 22 percent reported that they usually ate at least two servings of fruits, and, 35 percent, at least three servings of vegetables a day. Although most mothers (N = 111) reported that they ate less than two servings of fruits or less than three servings of vegetables daily, most also reported intending to eat more in the near future.

Implications

These results give health professionals some direction to address the dietary quality of low-income mothers and their children. Furthermore, these findings illustrate an area of opportunity for policymakers to increase the synergetic effectiveness of the EHS program by including some nutrition education. For example, Project FRESH, a food and nutrition education collaborative between the Women, Infants and Children (WIC) program and county Extension offices, is available in most states during the summer to help low income families eat more fruits and vegetables. Project FRESH offers mothers on WIC a $20.00 coupon redeemable at farmer's markets for produce. Only 12 percent of the EHS research project mothers had participated in Project FRESH. For the large group of mothers who intended to eat more fruits and vegetables, nutrition educational programs, such as Project FRESH, could be quite beneficial. More active promotion of food and nutrition related programs, integrated with EHS, could provide support to help limited income parents improve their food choices and health.

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928

COPING STRATEGIES OF LOW-INCOME MOTHERS: STABILITY AND CHANGE OVER THREE YEARS

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This study examines strategies for coping utilized by low-income, high-risk families. Stress has consistently been shown to impact the quality of relationships within the family (Webster-Stratton, 1990), which has been linked to child developmental outcomes. Low-income families enrolled in Early Head Start (EHS) and other prevention programs are generally considered at high risk for living in stressful environments and, in turn, for poorer parenting. Family coping strategies can potentially strengthen or maintain family resources that serve to protect the family from stressful situations. In this study, maternal reports of service use, economic need, and social resources were used to predict individual differences in the level of and change in coping behaviors over time, and EHS program participation was examined as a moderator of relations between baseline characteristics and change in such strategies.

Method

Sample. The sample for this study consists of 152 mothers and their infants participating in an ongoing longitudinal study of children eligible for Early Head Start in Jackson, Michigan. Seventy-eight of the families were not part of the EHS intervention, and 74 families were EHS participants. Mothers averaged 22.3 years of age (SD = 4.9) and mean income was \$9,090 (SD = \$6,419). The majority (76 percent) of the sample was Caucasian, 18 percent reported being African-American, and the remaining 7 percent of the sample reported being of other ethnicities. Forty-five percent of the sample reported not having completed a high school diploma at enrollment, 34 percent reported having completed high school or a GED, and the remaining 21 percent reported having attended some college (with three people having completed at least a two-year program).

Procedure: Maternal reports of coping strategies were collected at four points in time: at the time of enrollment (child age M = 4.8 months, SD = 3.61) and when the child was 14, 24, and 36 months old. All predictors used in the analysis were assessed at enrollment.

Measures: Coping. The Family Crisis Oriented Personal Scales (F-COPES) is designed to measure problem-solving behaviors and attitudes of families (McCubbin, Olson & Larsen, 1987). One subscale measures cognitive reframing (8 items, alpha = .68), and three subscales measure support seeking from: (a) family and friends (6 items, alpha = .76), (b) neighbors (3 items, alpha = .73), and (c) service providers (3 items, alpha = .64) (McKelvey, Schiffman, Fitzgerald & von Eye, in press). There were no significant differences between the program and comparison group on coping at enrollment.

Measures: Predictors of individual differences in coping (Schiffman et al., 2000):

1) Emotional support: The degree to which mothers report having someone to talk to them, provide support, take care of them when they are sick, provide encouragement, and have fun with them (3-pt. scale).
2) Social conflict: Count of the number of problematic social relationships reported, potential range of zero to five.
3) Public assistance: Count of public assistance programs, including WIC, TANF/AFDC, SSI, food stamps, Medicaid, rent subsidy and assistance with bill payment
4) Formal support services: Count of support services used by the family, including EHS, FIA, Health Center programs, MSS/ISS.
5) EHS program participation (yes/no).

There were significant differences between program participants and non-participants at enrollment on two of the measures: social conflict and formal support services. Families participating in EHS reported higher social conflict ($M = 1.31$) than non-EHS families ($M = .94$, $p < .05$). Furthermore, families in EHS reported higher formal support ($M = 1.97$) than non-EHS families ($M = 1.19$, $p < .01$). This would be expected given that EHS participants would be the recipients of one additional service (EHS). There were no other differences between the groups at baseline.

Results and Discussion

Hierarchical linear modeling (HLM; Bryk & Raudenbush, 1992) was used to examine relations between coping strategies and predictors measured at enrollment. Individual growth curves were represented by: (a) an intercept (*level* of support seeking at 36 months), and (b) a slope (*linear rate of change*). These estimates were used to derive an average growth curve. The average intercept and slope subsequently became the *dependent* variables, and predictor variables were entered to account for individual differences in each parameter. Each predictor was tested separately. To assist in interpretation, effect size r estimates are also included: .10, .30, and .50 indicate small, medium, and large effects, respectively (Cohen, 1988). Significant results are presented in Table 1.

Cognitive reframing. By the 36-month assessment, mothers reported increases in cognitive reframing over time regardless of EHS participation. Differences in the level of cognitive reframing were predicted by social conflict, with mothers who reported having more conflicted interactions also reporting less reframing. Differences in change in cognitive reframing were predicted by an interaction between social conflict and participation in EHS. Mothers who participated in EHS used the reframing strategy more consistently than non-EHS mothers,

TABLE 1
PREDICTORS OF MATERNAL COPING

Parameter	Effect size
Cognitive Reframing	
Level	--
Baseline social conflict	-.20**
Linear change	.28**
EHS program participation	.09
Baseline social conflict	-.16^{t}
Baseline public assistance	-.10
Baseline social conflict x EHS program participation	.20**
Baseline public assistance x EHS program participation	.17*
Seeking Support from Family and Friends	
Level	--
Linear change	.08
EHS program participation	-.04
Baseline emotional support	.16*
Baseline social conflict	-.16*
Baseline emotional support x EHS program participation	.17*
Baseline social conflict x EHS program participation	.17*
Seeking Support from Neighbors	
Level	--
Linear change	.00
EHS program participation	-.18*
Baseline formal support	.14^{t}
Baseline formal support x EHS program participation	-.17*
Seeking Support from Service Providers	
Level	--
EHS Participation	.20*
Baseline coupled	-.21*
Baseline coupled x EHS program participation	.21*
Linear change	.00

Notes: EHS = Early Head Start.

[a] Effect sizes cannot be negative. Directional sign is included to facilitate interpretation, where negative effect sizes in LEVEL represent lower levels at enrollment than at 36 months, and in LINEAR CHANGE represent decreases over time.

$^{t}p<.10$. $^{*}p<.05$. $^{**}p < .01$.

regardless of their degree of social conflict. In addition, change was predicted by an interaction between receiving public assistance and participation in EHS, such that mothers who participated in EHS showed consistent increases over time in use of cognitive reframing strategies regardless of their use of public assistance, whereas non-EHS mothers who used public assistance showed decreases in cognitive reframing over time.

Seeking support from family and friends. No overall change over time was evident in support seeking from family and friends. However, individual differences in change in seeking support were predicted by interactions between EHS participation and emotional support and EHS participation and social conflict. Both interactions suggest that seeking support from family and friends is moderated by participation in EHS. Results indicate that change in this coping strategy is relatively stable for mothers in the EHS program, whereas non-EHS participants demonstrate varied patterns of change over time based on reports of emotional support and social conflict at enrollment. Non-EHS mothers who reported having greater levels of emotional support increased in support seeking from family and friends over time, whereas non-EHS mothers who reported having less emotional support at enrollment decreased in their use of support from friends and family over time. Furthermore, non-EHS mothers who reported higher levels of social conflict at enrollment, demonstrated decreases in seeking support from family and friends. Alternatively, non-EHS mothers with few social conflicts reported an increase in seeking support from family and friends over time.

Seeking support from neighbors. No overall change over time was evident in support seeking from neighbors, but changes over time were moderated by EHS program participation. There was an interaction between formal supports and participation in EHS. Mothers who participated in EHS demonstrated no change in their seeking of support from neighbors over time, whereas non-EHS mothers who reported more formal supports were more likely to increase in support-seeking from neighbors.

Seeking support from service providers. There was no overall change over time in seeking support from service providers, but differences in level were predicted by EHS program participation, with those involved in EHS reporting seeking more support from service providers than non-EHS mothers. There was also an interaction between being partnered and participation in EHS. Although both EHS and non-EHS mothers who had a partner sought less support from service providers, non-EHS mothers who did not have a partner were especially unlikely to utilize this strategy for coping.

These results indicate that mothers in EHS, even those at potentially higher risk due to increased needs for services or lack of perceived support from others, are able to use positive coping strategies more consistently than non-EHS mothers. Among non-EHS mothers, those who perceive their support networks more positively tend to cope in similar ways as EHS mothers and those experiencing the highest levels of risk tend to cope increasingly poorly over time.

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VALIDATION OF NATIONAL CHILD LANGUAGE MEASURES AT 14 AND 24 MONTHS

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At the 14- and 24-month data collection points, the national evaluation of Early Head Start (EHS) relied primarily on the MacArthur Communicative Developmental Inventory (CDI; Fenson et al., 2000) as a measure of children's language development. The CDI is a checklist of age-appropriate language skills (e.g., vocabulary comprehension and production, use of gestures, sentence types) that is completed by parents. Whereas studies with middle-class families indicate that mothers are relatively good judges of their children's concurrent language use (Fenson et al., 1994), some researchers have questioned the accuracy of parental report by low-income mothers or those with lower levels of education (e.g., Arriaga, Fenson, Cronan & Pethick, 1998; Feldman et al., 2000). Thus, it was important for the current evaluation of EHS to ascertain how accurate mothers in the study were in assessing their children's vocabulary.

Research teams at Harvard Graduate School of Education and at New York University Graduate School of Education transcribed and analyzed parent-child discourse recorded during the 3-bag activity. The combined sample at the two sites was comprised of 161 dyads at 14 months and 158 dyads at 24 months. Mothers ranged in age from 14 to 43 years at the time of their children's birth. Approximately 45 percent of the mothers identified themselves as White, 25 percent as African American, 17 percent as Latina, and the remaining as West Indian or of mixed ethnicity. White mothers were all in the Vermont sample, while nearly all African American and Latina mothers were part of the New York sample.

The semi-structured 3-bag task from the 14- and 24-month national protocol provided the basis for detailed analysis of mother and child spontaneous speech. Videotaped interaction was transcribed and analyzed using the automated facilities of CHILDES (Child Language Data Exchange System; MacWhinney, 2000; MacWhinney & Snow, 1985). We focus here on two measures of child language use: the number of different words (*word types*) produced by the child and the total number of words (*total words)* spoken by the child. Other measures considered were children's MacArthur CDI comprehension and production scores at 14 months, MacArthur CDI production scores at 24 months, Bayley MDI scores at both ages and Bayley Language Factor scores at 24 months. Given the limited ethnic diversity in the VT sample, potential differences associated with ethnicity were explored only within the NY sample.

Wide variation was observed on all measures. Not surprisingly, children's spontaneous language production at 14 months was still quite limited. On average, children at this age produced 2.99 word types (SD = 3.97) and 6.42 total words (SD = 9.90) during the 10-minute 3-bag task. Maternal report on the MacArthur CDI indicated that children understood an average of 49.55 of the words inventoried (SD = 19.42) and produced an average of 12.35 words (SD = 13.03). The average Bayley MDI score was 95.87 (SD = 11.32). By 24 months, children's spontaneous language production had increased substantially, as indexed both by direct observation and by maternal report. Children produced an average of 40.59 word types (SD = 18.63) and 109.37 total words (SD = 75.31) in interaction with their mothers during the 10-minute observation. MacArthur CDI production scores averaged 53.17 (SD = 20.35). Average Bayley MDI scores fell to 85.26 (SD = 12.09). Bayley Language Factor scores averaged 6.77 (SD = 3.35).

Associations between child spontaneous speech measures, parent report measures, and children's performance on structured cognitive and language assessments are shown in Tables 1 and 2. Results showed that parental report of children's productive vocabulary at 14 months correlated moderately well with children's spontaneous vocabulary use as measured by word

TABLE 1
ASSOCIATIONS BETWEEN CHILD SPONTANEOUS SPEECH MEASURES, MATERNAL REPORT MEASURES, AND STRUCTURED ASSESSMENTS AT 14 MONTHS

	Word Types	Total Words	CDI Production	CDI Comprehension	Bayley MDI
Word Types					
Total Words	.88*** *(N = 161)*				
CDI Production	.43*** *(N = 158)*	.39*** *(N = 158)*			
CDI Comprehension	.19* *(N = 159)*	.14$^{n.s.}$ *(N = 159)*	.51*** *(N = 158)*		
Bayley MDI	.07$^{n.s.}$ *(N = 158)*	.07$^{n.s.}$ *(N = 158)*	.17* *(N = 155)*	.18* *(N = 156)*	

* $p < .05$
** $p < .01$
*** $p < .001$

TABLE 2
ASSOCIATIONS BETWEEN CHILD SPONTANEOUS SPEECH MEASURES, MATERNAL REPORT MEASURES, AND STRUCTURED ASSESSMENTS AT 24 MONTHS

	Word Types	Total Words	CDI Production	Bayley MDI	Bayley Language Factor
Word Types					
Total Words	.89*** *(N = 158)*				
CDI Production	.53*** *(N = 149)*	.40*** *(N = 149)*			
Bayley MDI	.60*** *(N = 151)*	.49*** *(N = 151)*	.52*** *(N = 147)*		
Bayley Language Factor	.68*** *(N = 133)*	.58** *(N = 133)*	.61*** *(N = 129)*	.78*** *(N = 137)*	

* $p < .05$
** $p < .01$
*** $p < .001$

types ($r = .43$, $p < .001$) and total words ($r = .39$, $p < .001$). Bayley MDI scores at 14 months showed no relationship to spontaneous speech measures and only a weak association with either CDI comprehension ($r = .18$, $p < .05$) or production ($r = .17$, $p < .05$), suggesting that the structured Bayley assessment at this age indexes children's language development only minimally. At 24 months, parent report of child language was strongly associated with both spontaneous speech measures (word types: $r = .53$, $p < .001$; total words: $r = .40$, $p < .001$) and with structured assessments (Bayley MDI: $r = .52$, $p < .001$; Bayley Language Factor: $r = .61$, $p < .001$). With few exceptions, these general patterns were found for families in both sites and across ethnic groups. Child productive vocabulary reported by Latina mothers was not associated with child word types at 24 months, possibly due to the small sample size ($N = 27$).

Regression analyses using maternal report of children's productive vocabulary to predict children's spontaneous vocabulary use (word types) and language performance on Bayley (Bayley Language Factor) confirm that parental reports of children's language development are congruent with actual vocabulary use and structured assessments, particularly at 24 months. At age 2, parental report alone accounted for 27.5 percent of variation in child word types and 37.5 percent in Bayley Language Factor scores. Controlling for maternal education, child gender and birth order, the variation accounted for by maternal report increased to 31.3 percent for word types and to 39.9 percent for Bayley Language Factor.

These results suggest that low-income parents' reports of children's language abilities are congruent with children's observed language use. Thus, parental report constitutes a valid outcome measure of program impacts on child language development. Bayley Language Factor scores, based on structured assessment with a relatively unfamiliar adult, are also strongly supported by direct observation of children's spontaneous speech in interaction with a familiar adult (i.e., primary caregiver), supporting the validity of the structured assessments used in the national evaluation.

940

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FUNCTIONS OF LANGUAGE USE IN MOTHER-TODDLER COMMUNICATION

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Note: This research is taken from: Roberts, J. & Tamis-LeMonda, C. S. (2000, June). Functions of language use in mother toddler communication. In J. Atwater (Chair), The social context of early language development for children in poverty. Symposium conducted at Head Start's National Research Conference, Washington, D.C.

Caregivers who provide children with verbally rich and responsive language environments in the early stages of language acquisition have children who excel in lexical, grammatical, and syntactic abilities, and who achieve important language milestones sooner in development. Indeed, one of the most consistent predictors of children's language achievements specifically, and school performance and cognitive development more generally, is the quality and quantity of verbal interactions with adult caregivers (e.g., Hart & Risley, 1995). In linking these findings to the Early Head Start Research Evaluation, impacts in the area of children's early language development and emerging literacy are expected to be obtained through the mediating effect of Early Head Start interventions on the quality of parent-child interactions, particularly those measures that capture the language use of mothers (such as stimulation and cognitive growth fostering). Demonstrating links between parenting and children's emerging language competencies is central to understanding and modeling associations between Early Head Start and developmental achievements in children.

In line with this goal, investigators at New York University have been closely investigating the sorts of language environments to which children are exposed in relation to children's early communicative abilities. Our aims in this study were to provide a descriptive analysis of maternal language and children's emerging communication at 14 months, and to examine associations between mothers' and children's language during this initial stage of language acquisition.

942

Because productive vocabulary is limited at 14 months, we developed a system for assessing children's communicative intentions, which incorporated verbalizations and gesture in determining whether or not children were intentionally communicating meanings with others. We expected maternal language that was both didactic and responsive (e.g., providing labels as well as imitations) to predict children's communicative abilities, and expected maternal language that was controlling, restrictive, and/or intrusive to be negatively associated with children's communication.

The sample consisted of the first wave of participants at New York University's local site, namely 75 ethnically diverse mother-child dyads (63.6 percent male children). The average age of the mothers was 21.8 years (range = 15 years 8 months to 44 years 10 months). The average age of the children was 14.4 months (range = 13 to 17 months). (Given such ranges, age was covaried from all analyses.) Mothers were primarily Black (57.5 percent) and Hispanic (41.2 percent). All mothers spoke English.

Data here are based on the ten-minute semi-structured three-bag, free play task used in the national protocol. Detailed transcriptions of all maternal speech and actions, and all child vocalizations and actions were made of this 10-minute interaction. Utterances were defined as units of speech as indicated by intonation and/or pauses. Transcripts were reviewed at least once for accuracy, prior to coding.

Language was coded from the transcripts while simultaneously viewing the tapes. All maternal utterances were coded into one of 17 several language functions (e.g., repetitions, expansions, paraphrases, descriptions, labels, open ended questions, closed ended questions, play prompts, prohibitions, criticisms, and attention directives). Children's vocalizations were classified into one of nine functions (e.g., labels, reference to action, notice, declaratives, objection, and distress). Children's communicative utterances had to have a clear intended meaning but were not restricted to standard adult word forms. For example, an utterance in which the child says "boo" while pointing at a book would be considered a label. An utterance in which the child says "uh" while reaching for an object would be coded as an action/object request. Contextual cues were considered in the determination of the communicative intent of all utterances.

Variation among mothers and among children in language amount and function was dramatic. Mothers expressed between 20 and 331 utterances within the 10-minute free play session (M = 167.5). Children expressed between 0 and 117 utterances (M = 33.6). The range and mean suggest that despite the young age of the sample, children were *often* clearly communicating to their social partners.

Factor analysis, with varimax rotation was conducted on mothers' and children's language. Three factors of maternal language emerged (see Tables 1 to 3):

1) Responsive/Didactic: language in which the mother is repeating and expanding on the child's vocalizations, reformulating the child's behaviors into words, proposing questions to the child, and labeling and describing objects and events.
2) Directive: language characterized by control and direction of children's actions as well as prohibitions and corrections,
3) Uninvolved/Hostile: language that is characterized by self-directed comments and criticism of the child.

For children, two factors of communication emerged (see Tables 4 and 5):

1) Communicative: utterances that are responsive to the social partner or relate information about objects, events, desires and interactions with others.
2) Distress: Child utterances that express discontent, frustration or objection.

944

TABLE 1
FACTOR LOADINGS: MATERNAL RESPONSIVE/DIDACTIC LANGUAGE

Communicative Function	Factor Loading
Reformulation	.730
Closed Question	.716
Conversational Filler	.685
Description	.654
Repetition	.608
Label	.595
Self Response	.569
Open Question	.536
Expansion/Extension	.523
Description with Gesture	.510
Label with gesture	.484
Play prompt	.454

TABLE 2
FACTOR LOADINGS: MATERNAL DIRECTIVE LANGUAGE

Communicative Function	Factor Loading
Action Directives	.815
Action Encouragement	.596
Requests for Repetition	.572
Attention Directives	.568
Action Directives with Gestures	.522
Prohibitions	.516
Corrections	.501

TABLE 3
FACTOR LOADINGS: MATERNAL UNINVOLVED/HOSTILE LANGUAGE

Communicative Function	Factor Loading
Questioning child's behavior	.800
Criticism	.778
Self-Directed Comments	.573

TABLE 4
FACTOR LOADINGS: CHILDREN'S COMMUNICATIVE LANGUAGE

Communicative Function	Factor Loading
Imitations	.781
Action/object Requests	.705
Response to social partner	.705
Reference to action in play	.692
Declarative	.673
Label	.669
Random Utterances	.572
Notice	.539

TABLE 5
FACTOR LOADINGS: CHILDREN'S DISTRESS

Communicative Function	Factor Loading
Distress	.739
Objection/Refusal	.607

Associations between maternal language and children's language were next explored. The maternal responsive/didactic factor related to the children's communicative factor (r = .54, p < .01) as did the maternal directive factor (r = .33, p <. 01), although not as strongly. The maternal directive factor also related to the children's distress factor (r = .24, p < .05). Further breakdown of these associations revealed that mothers' responsive/didactic language speech predicted children's imitations (r =. 61, p <. 01), expression of notice (r =. 30, p < .01), references to actions in play (r = .35, p < .01) and declaratives (r =.43, p <.01) whereas, directive speech *only* related to children's objections/refusals (r = .36, p <.01). The maternal uninvolved/hostile factor did not relate to children's language. All associations obtained over and above sample demographics.

In summary, strong associations existed between the kind of language mothers provide for their children and children's emerging communicative competencies. Maternal responsive/didactic language is the strongest predictor of toddlers' communicative competence; maternal directive language predicts toddlers' distress. Uninvolved/hostile language does not relate to toddlers' communication. These findings suggest the urgency of programs to support mothers in their use of frequent, responsive-didactic speech in order to encourage language fluency in children. A unitary focus on reducing hostile behaviors, while of great importance to social-emotional aspects of development, will not be sufficient to promote children's language achievements. Finally, interventions aimed at enhancing mothers' language use must be implemented soon in children's first year, as mothers are affecting children's abilities to effectively communicate well before children use "language" per se.

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PREDICTING EARLY HEAD START PROGRAM USE AND ACCEPTANCE BY PARENTS

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The research partnership between the Program for Early Developmental Studies in the Dept. of Psychiatry at the University of Colorado Health Sciences Center and the Clayton/Mile High Family Futures Early Head Start (CMHFFEHS) included as a principal goal the documentation of client engagement with the program. We sought to more fully understand how families respond differently to the home visiting intervention and to see what works best for whom under what circumstances. The research agenda included acquiring psychologically meaningful information about clients during the enrollment process. Using initial client assessments might assist home visitors during this relationship formation phase, not as a replacement for their own judgment of families, but as a supplementary tool to help meet client needs.

In this paper, we will present how these issues were addressed in our collaboration. Our collaborative goal was to explore whether client characteristics were predictive of patterns of participation in home visitation. If they were, we could then discuss whether the results might lead to a refinement of practices. We will begin with a brief review of prior efforts in the field to investigate determinants of program participation.

Typically, randomized trials of intervention investigate the intervention's effectiveness, asking the question, "Does the program work?" In such "intent-to-treat" approaches, there is an assumption of a monolithic treatment that is uniformly delivered, no matter how families may vary in amount of services delivered. Participants also experience an intervention in different ways and this will likely influence the benefits they receive. Previous studies have shown that variations in a mother's engagement with a program is related to program outcomes (Barnard et al., 1986; Korfmacher, Adem, Ogawa & Egeland, 1997; Lieberman, Weston & Pawl, 1991).

What predicts engagement in an intervention? How individuals use services and respond to an intervention depends, in part, on their personal characteristics and on the amount and type of support they receive from family, partners, and friends. Such links have been demonstrated for years in psychotherapy literature (Bergin & Garfield, 1994; Roth & Fonagy, 1996). Research suggests that mothers with who are at increased risk for parenting difficulties can be particularly helped by early interventions. For example, home visiting programs may be more successful among mothers with mental health difficulties such as depression (Lyons-Ruth, Connell, Grunebaum & Botein, 1991).

It is also possible that level of social support or interpersonal relatedness influence program use and engagement, although findings are inconsistent. Some studies show social support related to increased use and commitment to an intervention, while others demonstrate lower participation as social support increases (Birkel & Reppucci, 1983; Dunst, Lee & Trivette, 1988; Powell, 1988; Unger & Wandersman, 1988).

A study by Korfmacher and colleagues (1997) illustrates in particular the complexities of examining this issue. The authors found that insecure/dismissive mothers (with respect to their memories for past caregiving experiences) had an equally high level of contact with their home visitors as mothers with more secure representations. Qualitative ratings by the home visitors, however, suggested that their emotional involvement in the sessions was fairly shallow. In other words, although mothers were often available for visits, they seemed to keep their home visitors at an emotional distance, paralleling their avoidance of emotions when reflecting on their relationship history. This split between amount of contact and qualitative features of the contact suggests that any examination of the relationship between participant characteristics and program use should examine multiple dimensions of program participation.

Methods

Sample. One hundred sixty-two low income women who were either pregnant or had a child under the age of 12 months were recruited by program staff to participate in the national study of Early Head Start (EHS). They signed an informed consent form with the understanding that approximately half would be randomly selected to receive EHS program services plus developmental screenings and half to receive developmental screenings only. Eighty-three women were randomly assigned to the EHS services group.

The average age of the mothers was 21.4 years, 74 percent were unmarried, 40 percent were Latina, 36 percent were African American, 17 percent were European American, and 7 percent represented other ethnic groups. Seventy-two percent of the women spoke English well, but 28 percent were more proficient in Spanish. Forty-seven percent did not complete high school, 24 percent completed high school, and 29 percent reported some technical or college-level education.

Data Gathering. Following the recruitment visit and before random assignment, mothers completed a 2-hour interview with research staff that included the Head Start Family Information System (HSFIS) enrollment questions (providing basic demographic information) plus selected standardized questionnaires of psychological constructs that included measures of: depression (using the Center for Epidemiological Studies-Depression scale [CES-D: Radloff, 1977]), sense of personal mastery (Pearlin & Schooler, 1967), attitudes toward relationships (Simpson, Rholes & Nelligan, 1992), violence in partnered relationships (10 items from the Conflict Tactics Scale, Straus & Gelles, 1990), and stressful life events (using a 20-item life events scale by Mathematica Policy Research, 1996). Women's literacy was evaluated using the Letter-Word Identification subtest of the Woodcock-Johnson Tests of Achievement (Woodcock & Mather, 1989). Table 1 displays the sample means and standard deviations for these assessments. It is noteworthy that while 45 percent of women had depression scores above the CES-D cut-off, reported stressful life events and domestic violence were very low. The group means for personal mastery and difficult relationship attitudes were slightly about the mid-point for these scales.

TABLE 1
MEANS AND STANDARD DEVIATIONS IN BASELINE PSYCHOLOGICAL CHARACTERISTICS

Item	**Mean**	**Standard Deviation**
Depression	16.97	10.15
Domestic Violence	0.64	1.63
Personal Mastery	2.98	0.55
Difficult Relationship Attitudes	2.68	0.66
Stressful Life Events	0.27	0.13
Literacy Level (grade equivalent)	11.00	4.21

Home visitors tracked their contacts with families and recorded information about each visit on the collaboratively designed home visit tracking form. The average number of months women were in the program as of 12/31/99 was 21 months and ranged from less than one month to 37 months. The average number of visits over the three years was 45 (median = 44) but ranged from 0-131; this included 10 mothers who had no home visits after random assignment. The average length of visits was 80.9 minutes. Following each visit, home visitors rated mother's level of involvement on a scale ranging from: (1) Not involved, inattentive, not participating to (5) Highly interested/involved, attentive. The distribution of these involvement ratings was positively skewed; the mean was 4.80 (SD = .27) and the median was 4.91. Average involvement was below the mean for 40 percent of the 83 women, including the ten women who completed no visits. Three years after enrollment began, at a point when recruitment was completed and families had potentially received services for two years or more, the research team undertook examination of the data and shared those results with program staff.

Data Analysis. In order to examine the association between maternal baseline characteristics and subsequent patterns of participation, we began by correlating the five psychological dimensions, plus maternal age and literacy level with the frequency of home visits and the average level of involvement rated by home visitors. As noted earlier, however, we realized that amount of visiting and involvement in the visits provides more information when considered together. To capture this, an aggregate measure containing classifications of participation was constructed. This was done by cross-tabulating information about frequency and involvement, dichotomizing each distribution at the mean.

This produced five groups; two clearly reflected lower participation. Never Engaged women completed no visits (N = 10) and Disengaged women completed fewer than average visits and were rated lower than average on involvement (N = 15). Two patterns reflected mixed participation in the program: Superficially Engaged women who completed greater than average visits but were rated lower than average on involvement (N = 10) and Sporadically Engaged women who completed fewer than average visits but were rated higher than average on involvement (N = 15). The fifth group included Highly Engaged women who completed greater than average visits and were rated higher than average on involvement (N = 33). Number of visits and average involvement were weakly, but significantly correlated ($r = .29$, $p < .05$). Using the GLM procedure from SAS, we tested differences between the least square means of these five groups on the five psychological dimensions, plus maternal age and literacy level.

Results

Examining associations between the variables assessed at program entry (the five psychological constructs, maternal age and literacy level) with the later frequency of home visits and mother's level of involvement in visits, yielded no significant correlations (see Table 2). In other words, program participation variables, when considered separately as single constructs, were not predicted by baseline characteristics.

TABLE 2
CORRELATIONS BETWEEN MATERNAL CHARACTERISTICS AND DIMENSIONS OF HOME VISITING

Item	Number of Visits (n = 83)	Average Involvement (n = 73)
Depression	.02	-.14
Domestic Violence	.07	-.02
Personal Mastery	-.02	.21
Difficult Relationship Attitudes	.19	.00
Stressful Life Events	-.06	-.14
Literacy Level	.07	.16
Maternal Age	-.04	.11

The story was different, however, when program participation dimensions were combined into classifications. We examined the associations between the five classifications of participation and these same baseline variables (see Table 3). As can be seen, significant differences were observed primarily between the Superficially Engaged women and the women with higher involvement scores (sporadically engaged and highly engaged). Superficially

TABLE 3
LEAST SQUARES MEANS FOR PATTERNS OF PROGRAM PARTICIPATION IN RELATION TO MATERNAL CHARACTERISTICS AT BASELINE

	Depression	Domestic Violence	Mastery	Relationship Attitudes	Stressful Life Events	Literacy Level	Maternal Age
Never Engaged	16.9	0.01	3.10	2.34	0.33	12.32	$24.60^{b,c}$
Disengaged	18.6	0.06	2.87	2.55	0.25	10.07	21.13
Superficially Engaged	20.2	0.05	$2.54^{a,d,e}$	$3.24^{a,b,d,e}$	$0.36^{d,e}$	10.25	19.90
Sporadically Engaged	16.3	0.03	3.05	2.70	0.24	10.69	19.80
Highly Engaged	17.0	0.09	3.09	2.67	0.26	11.40	21.91

(a) $p < .05$ different from Never Engaged
(b) $p < .05$ different from Disengaged
(c) $p < .05$ different from Superficially Engaged
(d) $p < .05$ different from Sporadically Engaged
(e) $p < .05$ different from Highly Engaged

Engaged women, compared to sporadically engaged women, reported lower personal mastery (T1,82 = 2.35, $p < .05$), more difficult relationship attitudes (T1,82 = 2.06, $p < .05$), and more stressful life events (T1,82 = 2.11, $p < .05$). Superficially Engaged women, compared to Highly Engaged women, reported a lower sense of personal mastery (T1,82 = 2.82, $p < .01$), difficult attitudes toward relationships (T1,82 = 2.51, $p < .02$), and stressful life events (T1,82 = 2.05, $p < .05$). In addition, Superficially Engaged women also reported lower mastery and more difficult attitudes toward relationships than the Never Engaged women (T1,82 = 2.34, $p < .05$) and their attitudes toward relationships were also more difficult than the Disengaged group (T1,82 = 2.65, $p < .01$). Finally, maternal age also differed across groups: the Never Engaged women were significantly older at the time of program enrollment than either the Superficially Engaged (T1,82 = 2.36, $p < .05$) or Sporadically Engaged women (T1,82 = 2.64, $p = .01$). In addition, there were non-significant trends for Never Engaged women to be older than Disengaged and Highly Engaged women.

Discussion

Striking differences were found between the Superficially Engaged women and women rated by their home visitors as more involved during their meetings. This pattern of participation seemed to delimit a meaningful subgroup of mothers with particular psychological characteristics at program entry. Superficially Engaged women had a lower sense of personal mastery, more difficult attitudes toward relationships, and greater life stress at enrollment than women who became more involved in the program. Participating in a superficial manner meant that although clients were often home and available for visits, visitors experienced these women as less attentive and inquisitive during their meetings. This fits the greater reticence reflected in their attitudes toward relationships reported at enrollment, a finding similar to results reported by Korfmacher and colleagues (1997) with a different home visiting model. The lower sense of personal mastery and high levels of stress reflected in the number of recent life events reported at enrollment suggest that their relatively high attendance may be a reflection of some disorganization or lack of mobilization that kept them home and available for visits.

With respect to these psychological characteristics, Superficially Engaged women appear to have greater risks than the other groups and may stand to benefit most from the home visit services compared to their control group counterparts. That they appeared less inclined to engage with visitors is one of the challenges of relationship-based practice. Other programs have demonstrated the benefits of home visitor persistence in meeting with families in need (e.g., Olds & Korfmacher, 1998), even when these families were very passive or ambivalent in their involvement (e.g., Greenspan et al., 1987).

Both research and program staff were surprised that Never Engaged or Disengaged women did not differ from women who had patterns of greater program participation. We jointly considered how the Never Engaged group might have been an artifact of the random assignment process. The women in this group were older than the other groups, had the highest sense of personal mastery, and the most positive attitudes toward relationships. Therefore, they may have had lower perceived needs for the structured relationship-based approach of the program.

Disengaged women, who gradually withdrew from program participation, on the other hand, did not stand out in any way. Their low engagement with the program may have been occasioned by an unexpected move from the neighborhood or other factors unrelated to their initial reported characteristics. Perceived passivity and uninvolvement may also have discouraged visitors from pursuing these women. The enrollment assessment measures, however, did not provide insight about them.

As a result of these partnership discussions, CMHFFEHS decided that supplementing their enrollment process with brief assessments of psychological characteristics of mothers would be a valuable addition to their regular protocol for two reasons. First, in the spirit of continuous learning and improvement, they expressed a desire to actively collect such information themselves and see if they could respond better to individual needs and improve engagement levels. Second, they developed a strong appreciation for the role of assessment in establishing client-home visitor relationships.

Finally, we should consider what resources a program might need to implement a systematic assessment process at program entry. A trained staff person who is able to administer standardized questionnaires as part of an enrollment process is essential. Also essential is an information management system that will permit timely data basing along with a plan for periodically summarizing information so as to examine distributions and associations between participation and initial characteristics. A continuous improvement partner working with the program may provide these data skills. Most importantly, supervisors and visitors need training and on-going support to interpret the profiles that emerge from these assessments. Such expertise is crucial for information of this kind to be used appropriately as a supplement to the judgments of program staff regarding how to work successfully with the families they serve.

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HOW MUCH BETTER THAN EXPECTED? IMPROVING COGNITIVE OUTCOMES IN UTAH'S BEAR RIVER EARLY HEAD START

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What are the strongest early predictors of later cognitive skills? Can Early Head Start (EHS) buffer the effects of early risk indicators? Is the developmental trajectory of cognitive skills different for EHS children than comparison group children? Do EHS children do better than expected, based on predictions? And if they do better than expected, what aspects of EHS are related to how much better they do? These are some of the questions we asked as part of our local research with Utah's Bear River Early Head Start.

The goal of Bear River EHS is to improve the developmental outcomes for infants and toddlers by helping low-income parents provide experiences infants and toddlers need during their early development. For children at risk because of poverty, EHS tries to help keep them on track developmentally so they make the same cognitive gains as children in more optimal circumstances. Families who applied and qualified for Bear River EHS were randomly assigned to either EHS or a comparison group, with children in EHS expected to do better developmentally because of the extra support provided by the program for them and their parents.

Of course in both the EHS and comparison groups, all of the infants and toddlers developed. The question is whether EHS children developed "more." To answer that question is challenging. One challenge is that the population which is served by EHS programs varies widely in many ways: family background, reasons for the family's low-income status, psychological and social functioning of the parents, and even the extent to which the family participates in the EHS services offered. These complex variations together form the context in which infants and toddlers develop and must be examined in order to assess developmental progress. An even greater challenge is that development in the first three years is rapid and variable with spurts and lulls common to all children. Also, during the first three years of life, developmental trajectories become increasingly differentiated for children in different environments.

In populations considered "at risk" for various reasons, there is a common pattern of early development. Except for those with relatively severe medical or developmental problems, test scores in the first year are typically about the same for infants in at-risk environments as they are for infants in low-risk environments. In the second and third years of life, however, the developmental trajectories begin to diverge for children in different environments (Egeland, Sroufe & Erickson, 1983; Egeland & Erickson, 1987; Gorman & Pollitt, 1992; Johnson, Diano, & Rosen, 1984; Rogan & Gladen, 1993; Villar, Smeriglio, Martorell, Brown & Klein, 1984). Children at risk because of poor nutrition, drug exposure, low socio-economic status, or poor parenting begin to fall behind; their cognitive test scores begin to decline compared to their peers. For this reason it is especially important to consider the complexities of early environments and to consider changes with time or age in addition to assessing intervention group differences on developmental test scores.

Despite all the variations in family context, in EHS participation, and in developmental trajectories, it was expected that those who had been randomly assigned to EHS would make more progress in cognitive skills than those who had not. Indeed, previous analyses indicated that by age two, EHS children's cognitive skills were "better than expected," and comparison group children's were "worse than expected," based on early predictors that included both family and child variables (Roggman, Boyce & Cook, 2001). To test whether EHS children at age three continued to do "better than expected," as they had seemed to at age two, it was essential to look at interactive effects of EHS with developmental change over time.

By looking at the combination of developmental change in cognitive skills (comparing tests with earlier assessments) and intervention (comparing EHS to a comparison group) we can see a pattern of effects that takes into account both early risk factors and maturation in addition to differences in environmental support provided to the EHS group versus the comparison group. To see if the developmental path or trajectory for cognitive skills is different for children in EHS versus the comparison group, we included both age and intervention group in our data analyses. Our approach to statistical analysis is different from that used for the national cross-site study first because it considers both age and intervention together, and second because it includes early predictors from before families were enrolled in the EHS research study.

We have used several statistical methods to test the question of whether development is "better" for children in our local EHS group versus the comparison group. For each set of analyses, we used developmental measures at more than one age point, a grouping variable indicating whether the child's family was in EHS or not, and in addition, a set of the strongest early predictors of children's cognitive outcomes at age three.

Method

Our EHS local research project included 201 mothers (103 EHS group, 98 comparison group) who were either pregnant at the time of application or had infants less than10 months old. To meet program requirements, over 90 percent were low income as defined by federal poverty guidelines, and most families (97 percent) received some sort of public assistance such as Medicaid, food stamps, and WIC. Most children were Caucasian (82 percent, 11 percent Latino, 7 percent other). Their mothers were mostly married or living with a partner (73 percent), over the age of 19 (75 percent; mean age = 22.9), had at least a high school education (65 percent), and were not working (79 percent). Family size at enrollment ranged from zero to seven children.

The developmental outcome that is the focus of this study is cognitive skills. Cognitive skills were assessed using the Bayley Scales of Infant Development at 14, 24, and 36 months. These data were collected as part of the national study. Additional data for this study included early measures of parent functioning expected to be related to children's development. These data were from interviews with mothers before random assignment to EHS or a comparison group. In addition, data were collected assessing the quantity and quality of services to the families in EHS.

Maternal interviews included questions about family characteristics (e.g., education, employment, income, ethnicity, marital status, family size). These interviews also included questions adapted from questionnaire scales developed for measuring various aspects of psychosocial functioning. The scales used for these analyses included those measuring maternal depression, social support, and attitudes about close relationships. The measure of maternal depression was The Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977). Questions from the CES-D ask how often in the past week the individual has had emotions and thoughts associated either positively or negatively with depression, such as "I felt happy," or "I thought my life had been a failure." Reliability on this measure has been reported as a coefficient alpha of .92 (Radloff, 1977). Social support was assessed using items from the Family Crisis Oriented Personal Evaluation scale (F-COPES) of family coping related to the use of social support from friends, neighbors, and relatives (McCubbin & Patterson, 1982). Questions were modified from the F-COPES to use less difficult language and to ask how frequently the mother was likely to use these coping strategies. Parents were asked how often they sought support when there was a problem, for example, how often they "talk about a problem with neighbors" or "seek advice from relatives." Reliability on this measure has been reported as a coefficient alpha of .83 (McCubbin & Patterson, 1982). Attitudes about close relationships were measured by the Adult Attachment Style scale, providing an avoidance index in addition to an overall insecurity score. Questions include "I find it difficult to trust others completely" and "I'm comfortable having others depend on me" (Simpson, Rholes & Nelligan, 1992). Although the scale was originally developed to assess orientation toward romantic relationships, the few items that refer to "partner" were revised to refer to "people close to me" to include relationships with family members or close friends. Reliability on this measure has been reported as a coefficient alpha of .81 (Simpson, et al., 1992).

In addition to maternal interview and child testing data, data for this study also included indicators of the quantity and quality of EHS services. Program staff provided a tally of the number of home visits and group activities in which each family participated. In addition, videotaped home visits were coded using observational measures. Trained coders rated parent engagement from 1 (unengaged) to 6 (highly engaged) using an established scale (McBride and Peterson, 1997). Coders also rated the effectiveness of home visitor facilitation of parent-child interaction during home visits. Coders used a 5-point coding scheme developed with program staff, with 1 representing no home visitor facilitation or overly intrusive and directive behavior and 5 representing effective facilitation and responsiveness. A second coder independently coded 13 of the home visit videotapes (22 percent of the total 58 tapes), and inter-rater agreement was the same for both scales used in the analyses, 88 percent, Kappa = .75.

Our analyses involved a series of steps to assess whether or not EHS children were performing better than expected on cognitive skills tests. First, we explored possible early risk indicators by calculating correlations between early measures and later cognitive outcomes. Second, we tested the statistical interaction of development and intervention in a repeated measures analysis of variance testing age by group interactions, with age point as a within subjects variable, EHS versus comparison group as a between subjects variable, and selected early predictors as covariates. Third, we developed regression models of early predictors of later outcomes, assessed "better than expected" outcomes by examining the residuals (differences between predicted and actual scores), and compared the residuals for EHS versus the comparison group. This approach to analysis of longitudinal data has been used successfully in previous studies of constructs similar to those of interest in the proposed research (Pianta, Sroufe & Egeland, 1989; Roggman, Hart & Jump 1996). Finally, we explored correlates of the residuals to see what the strongest predictors were of children doing "better than expected."

Results and Discussion

What are the strongest early predictors of later cognitive skills? Expected predictors of later developmental outcomes were examined. The strongest predictors of poor cognitive skills at 36 months were measures of cognitive skills at earlier ages, 14 and 24 months, $r = .48$, $p < .001$; $r = .67$, $p < .001$. Of course, other aspects of the early environment may also affect poor cognitive development. Risk factors were examined that were expected to predict cognitive outcomes among the toddlers in this sample. Indicators of poor parental functioning that predicted poorer later cognitive skills included low maternal education, $r = .29$, $p < .01$, high maternal insecurity--specifically avoidance in close relationships, $r = -.30$, $p < .01$, and infrequent family use of social support, $r = .26$, $p < .01$.

Is the development of cognitive skills any different for EHS than comparison group children? To answer this question, we used a repeated measures analysis of variance with time of measurement as a within-subjects variable and program versus control group as a between-subjects variable. Our analyses also included covariates based on the strongest earlier predictors: maternal education, insecurity, and social support. We tested the statistical interaction of age and group to see if change over time was different for children in the EHS program group versus the comparison group. Results of between-group repeated measures (by age) analyses of variance showed that for cognitive skills scores, there were statistically significant interactions between age and group, $F\ (2, 83) = 3.68, p < .05$. What this means is that for cognitive skills, age changes were different for those in EHS than for those in the comparison group. Simple effects tests were used to test age changes within each group, the EHS group and the comparison group. Across the three age points, EHS toddlers maintained stable standardized test scores that did not change significantly with age, while comparison group toddlers, similar to others in poverty, began to lose ground as indicated by statistically significant decreases in their standardized cognitive skill scores (simple effects test for comparison group, $F\ (2, 163) = 6.2, p < .01$). Figure 1 shows the different trajectory for the EHS children versus the comparison group.

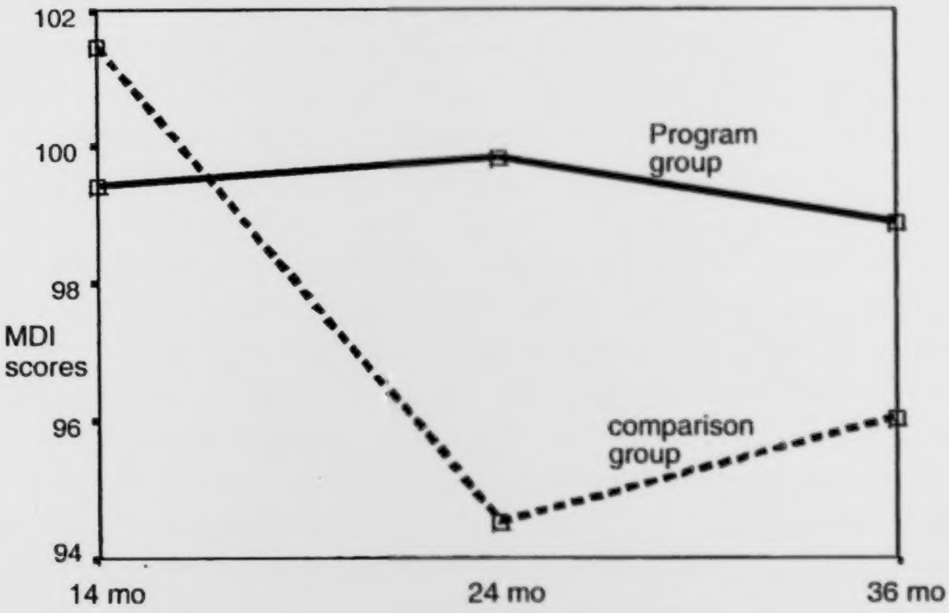
Do EHS children do better than expected, based on early predictors? To answer these questions, we compared children's actual test scores with their predicted ones. The predictions were based on regression models using the strongest early predictors. We used the earlier assessment along with early risk predictors to predict later outcomes. The strongest earlier predictor is, of course, an earlier measure of the same thing. We included the earliest measure of cognitive skills, the Bayley at 14 months, in all regression models. Low maternal education at enrollment was the most persistent predictor of low scores on later cognitive skills assessments so we included maternal education level in all models as well. To get the best prediction, we also included maternal avoidance in close relationships and use of social support to predict later cognitive skills at 36 months. The resulting regression model explained about a third of the variance in cognitive skills scores, $R = .60$, $Adj.R^2 = .33$, $F\ (4, 89) = 12.5, p < .001$.

Based on this predictive model, we examined the residuals, the differences between the predicted scores and children's actual scores, to see if children were doing better or worse than expected in the cognitive domain. The greater the distance the actual score was *above* the predicted score, the more a particular child was doing better than expected; the greater the

FIGURE 1

DIFFERENCES OVER TIME IN COGNITIVE SKILLS

Bayley MDI Standardized Scores



distance the actual score was *below* the predicted score, the more a particular child was doing worse than expected. The EHS children were, on the average, doing better than expected; the comparison group were, on the average, doing worse than expected. The group difference in these residuals was statistically significant, $t\ (90) = 2.1, p < .05$.

EHS children do better than expected in cognitive development. What aspects of EHS are related to how much better they do? Measures of the quantity and quality of EHS services, for those who received at least 6 months of services, were examined in relation to the size of residuals, that is, to how much better the cognitive skills scores were than expected based on early predictors. The strongest correlate of the residuals was the rating of parent engagement during observed home visits, $r = .37, p < .05$. Additional variables were, in turn, related to parent engagement during home visits. These included the effectiveness of home visitors in facilitating parent-child interaction during home visits, $r = .53, p < .001$, total number of group activities attended, $r = .30, p < .05$, and lack of maternal avoidance in close relationships, $r = -.43, p < .01$. Mothers who were more engaged in home visits were thus more trusting and responsive to close relationships, more likely to participate in other program activities, and more likely to have more facilitative home visitors.

Summary

In summary, the developmental trajectory is better for children in EHS compared to the comparison group. Early risk factors of poor maternal education, maternal avoidance, and infrequent family use of social support appeared to be buffered by the EHS experience. While cognitive skills scores declined for the comparison group, they did not for the EHS children. For children from low-income families in northern Utah and southern Idaho, those who had been enrolled in Bear River EHS had better than expected outcomes in the cognitive domain. They did better on cognitive tests than expected, maintaining age appropriate progress in their cognitive skills in spite of early test scores and early risk factors. In contrast, toddlers in the comparison group did not show similar progress in the cognitive domain; they did not maintain age appropriate cognitive skills. The advantage gained by EHS children was evidently due to the level of engagement of their mothers during the EHS home visits, engagement that was related to more involvement in other EHS activities, more facilitative home visitors, and less maternal avoidance.

By examining both age changes and intervention, our results indicate a different developmental trajectory for EHS toddlers versus the comparison group. Even though the average group differences in Bayley scores are not large clinically, the EHS group is maintaining their trajectory during an age period when children with similar risk factors typically begin to decline. This difference in trajectories is especially important for an at-risk group whose developmental trajectories, with increasing age and exposure to risk factors, would be expected to diverge substantially from those children in more optimal environments.

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FATHER-CHILD INTERACTIONS: MEASURING PAST PATERNAL INFLUENCES

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Introduction

Research on father involvement has increasingly shown that fathers play a significant role in their children's development (Lamb, 1997). Studies examining father-child interactions have predominantly characterized fathers as "playful," with less attention to other important dimensions, such as responsiveness or didactic behaviors (Hossain & Roopnarine, 1994; MacDonald & Parke, 1984; Parke, 1996). There have only been a small group of studies that investigated fathers' childhood experiences with their parents in relation to their parenting style (Cowan & Cowan, 1990; Onyskiw, Harrison & Magill-Evans, 1997; Cohn, Cowan, Cowan & Pearson, 1992). Of those studies, only one known study has specifically examined fathers' relationship with their fathers (Cox, Owen, Lewis, Riedel, Scalf-McIver & Suster, 1985). The following study expands on this work by examining fathers' childhood relationships with their fathers in relation to their own parenting interactions.

In the present investigation, we examined the interaction styles of 57 ethnically diverse, inner city fathers engaged in play with their 24-month-old children. Specifically, our goals were to:

- Describe the nature of fathers' interaction styles with their two-year-old children.
- Compare the relations between fathers' interaction styles with their children's social, emotional, and cognitive behaviors.
- Assess the extent to which fathers' perceptions of their relationship with their fathers relate to their interaction styles with their children.
- Explore men's feelings toward and perceptions of their childhood experiences with their fathers by examining a subsample of 18 qualitative interviews.

Methods

Participants

Participants were 57 fathers/father-figures and their children (28 boys and 29 girls). Most, 88 percent (N = 54), were biological fathers; three were stepfathers. Sixty percent (N = 34) of fathers had been living with their children since birth, and the majority, 72 percent (N = 41), were single. At the time of interview, fathers ranged from 18 to 46 years of age (M = 25.5, SD = 6.21). The children were between the ages of 24 and 30 months (M = 25.4, *SD* =1.65). Fathers came from diverse racial backgrounds: 64.9 percent (N = 37) Latin American, 26.3 percent (N = 15) African American, 5.3 percent (N = 3) Asian American, and 3.5 percent (N = 2) European American. Forty-two fathers spoke English and fifteen spoke another language (13 Spanish, 2 Mandarin). Almost half, 43.9 percent (N = 25), of fathers completed 11 or less years of high school, 29.8 percent (N = 17) graduated from high school or received their GED, and 26.3 percent (N = 15) completed some college or graduated from college. All families were low-income and eligible to receive some form of governmental assistance (e.g., Medicaid, food stamps, WIC). More than half of fathers, 89.4 percent (N = 51), reported working full-time or part-time, and their mean monthly income was $1,291.74 (SD = $979.49; range: $0 to $4,000).

Videotaping Procedures

Father-child interactions were videotaped during four activities, including 10 minutes of semi-structured free play, which formed the basis of the present investigation. During free play, toys were presented to fathers in three separate bags (bag #1 - a book, bag #2 - a pizza set and telephone, and bag #3 - a farm with farm animals). Fathers were asked to sit on a mat with their children, to ignore the camera, and to do what they would ordinarily do with their children. They were instructed to only play with the toys from the three bags and to start with bag #1, move on to bag #2, and finish with bag #3. They were told that they could divide up the 10-minutes as

974

they liked. Fathers were asked not to allow their children to use a pacifier during the videotaping, so that the researchers could hear children's verbalizations.

Measures

Father-Child Interactions. The quality of father-child interactions was assessed using the Caregiver-Child Affect, Responsiveness, and Engagement Scale (C-CARES; Tamis-LeMonda, Ahuja, Hannibal, Shannon, & Spellmann, 2001) which rates various father, child, and dyad behaviors. Fourteen father and 11 child items were used. Each item was rated using a 5-point Likert scale ranging from 1 = not observed to 5 = constantly observed. Father items included: positive verbal statements, negative verbal statements, participation with child, responsiveness to non-verbal cues, responsiveness to verbal cues, emotional attunement, flexibility, intrusiveness, structuring, achievement orientation, amount of language, quality of language, symbolic play, and creative play. Child items included: positive affect, negative affect, emotional regulation, participation with caregiver, responsiveness to caregiver, emotional attunement, involvement with toys, persistence, amount of language, quality of language, and symbolic play.

Demographic data. Demographic information, including residency, marital status, age, race, education, and income was collected during interviews with fathers. In addition, fathers were asked how often they spent one or more hours a day with their child; how much help they provided in caring for their child; and how much influence they had in making major decisions about their child's education, religion and health care needs. All responses were rated using 3- or 5-point Likert scales.

Paternal Childhood Experiences. The adult version of the Parental Acceptance-Rejection Questionnaire (PARQ) was used to measure fathers' perception of their acceptance and rejection from their fathers during childhood. The PARQ is a self-report instrument that is rated on a four-point scale. Twelve items from the 60-item scale were selected—seven items on the acceptance scale and five items on the rejection scale (PARQ; Rohner, 1991). Fathers were asked how their father treated them while they were growing up using a scale from 1 = "almost always true" to 4 = "almost never true." Sample questions included, "My father said nice things about me," and "My father saw me as a big bother." Two scale scores—paternal acceptance (7 items) and paternal rejection (5 items) were calculated. Prior to obtaining each scale score, all items were reverse scored. A high score on paternal acceptance signified a maximum perceived acceptance and a high score on paternal rejection signified maximum perceived rejection.

Men frequently perceived experiencing high levels of acceptance and low levels of rejection from their fathers/father-figures during childhood. Men's mean score on the parental acceptance scale was 22.35 (SD = 5.67), with a potential range from 7 to 28, suggesting, overall, this group of men had positive perceptions of their relationship with their fathers. Their mean score on the paternal rejection scale was 8.02 (SD = 2.98), with a potential range from 5 to 20.

Qualitative Interviews. After completion of the quantitative interview, a 30-minute semi-structured qualitative interview was conducted. The qualitative questions contained different questions, three of which are the focus here—men's perceptions of their paternal childhood relationship and how this relationship has influenced their own parenting. In response to the interviewee's reply, subsequent questions were asked in an attempt to get the interviewee to share his personal experiences more deeply. The qualitative interviews were tape-recorded and transcribed verbatim.

Fathers' transcripts were examined with respect to: (a) the details of fathers' childhood experiences with their father, (b) how fathers spoke about their feelings toward their father when describing their experiences, and (c) how fathers perceived their relationship with their father in relation to their own parenting. Written transcripts of the interviews were reviewed three times and different colored markers were used to highlight these three aspects of fathers' stories (Brown & Gilligan, 1991).

The first reading focused on how fathers described and reflected on their fathers' involvement with them during childhood as reflected in Lamb, Pleck, Charnov, and Levine's (1987) taxonomy: (a) *Accessibility*: a father's presence and availability to his child, regardless of the quantity or quality of their interactions; (b) *Responsibility*: a father's ability to meet his child's needs, such as providing financially to him/her; and (c) *Engagement*: a father's shared interactions with his child, such as playmate or teacher. The second reading identified how fathers spoke about their feelings toward their father by locating when and how they described their fathers in their stories (e.g., expressions of anger, apathy, disappointment, warmth or pride). The third reading located men's perceptions of how their childhood experiences with their fathers' related to their own parenting, and focused on their similarities and/or differences in their parenting approach to their fathers. Themes identified for all three readings in each father's narrative were coded and frequencies were calculated on a separate grid.

Results

Father Involvement

The participants in this study comprised of highly involved fathers. Over three-quarters of the fathers, (N = 41), reported that they spent "every day or almost every day" with their children. Almost two-thirds (N = 35) reported they looked after their children alone "every day or almost every day" and reported they provided "a lot of help" in caring for their children. The majority of fathers', 68.4 percent (n = 39), believed they had a great deal of influence in making major decisions regarding their children's heath care, education, and religion.

Types of Father Interaction Styles

To explore if distinct groups of father interaction styles exist, a cluster analysis was performed which included 15 father items on the C-CARES. First, an agglomerative hierarchical procedure using Ward's method was conducted to determine an estimate of the number of groups that would emerge. Analysis indicated a three-cluster solution best fit the data. Second, a k-means iterative clustering procedure was used in which the centroids derived from the hierarchical solution were entered. Cluster analysis suggested three different paternal interaction styles:

1. *Responsive/Didactic* fathers (42 percent; N = 24) were child-focused. They were highly responsive, emotionally attuned, and flexible, as well as sophisticated in their verbal and play interactions with their children.
2. *Overbearing* fathers (28 percent; N = 16) were achievement-oriented, through using intrusive, highly structured interactions with their children.
3. *Disengaged fathers (30 percent; N = 17) displayed less engaged, responsive, and involved interactions* with their children.

Finally, to test the strength of the classification logarithm, a discriminant function analysis was performed using the 15 father items on the C-CARES as predictors of membership in the three groups. As indicated in the Wilks lambda analysis, both functions were strongly associated with between group membership and father items on the C-CARES, χ^2 (28) = 145.66, $p < .001$ and χ^2 (2) = 57.52, $p < .001$.

Function 1. Group membership accounts for 69.9 percent of the variance in Function 1. This function discriminates the three groups of fathers as follows: (a) responsive/didactic (2.65), (b) overbearing (-1.88), and (c) disengaged (-2.60). The standardized canonical discriminant function coefficients associated with Function 1 illustrate that responsiveness to nonverbal, non-distress (.57), emotional attunement (.50), language quality (.34), responsiveness to verbal non-distress (.34), symbolic play (.33), and creative play (.30) contribute to scores on this function.

Function 2. Group membership account for 30.4 percent of the variance in Function 2. This function also distinguishes differences among the three groups of fathers: (a) responsive/didactic (.00), (b) overbearing (2.05), and (c) disengaged (-1.88). The standardized canonical discriminant function coefficients significantly associated with the scores in Function 2 are the variables intrusiveness (.51), flexibility (-.44), language amount (.43), participation (.37), achievement orientation (.37), structuring, positive verbal statements (.24), and negative verbal statement (.19).

There was 98.2 percent accuracy in correctly classifying the grouped fathers. These findings confirm the validity of the three-cluster group.

Three Types Of Father Interaction Styles: Comparisons Of Fathers' Demographics, Their Children's Behaviors, And Their Childhood Experiences With Their Fathers

Three sets of one-way ANOVAs were conducted to assess whether types of father interaction styles differed based on men's demographics, their children's behaviors, and their childhood relationships with their fathers. First, differences in types of father interactions based on demographic variables (residence, marital status, number of children, age, income, education, immigrant status; level of involvement; and child's age and gender) were examined. There were no significant differences in fathers' demographic data, reports of their involvement with their children, or their children's age based on fathers' interaction style, Fs (2, 54) range = .17 to 1.94, $p > .05$). The only exception was that the responsive/didactic fathers had significantly more daughters than the overbearing fathers, Fs (2, 54) = 3.74, $p < .05$). There were no differences in fathers' interaction style based on their race (Latin American, African American, Asian American, and European American), χ^2 (4, N = 57) = 4.23, $p > .05$.

Second, a series of One way ANOVAs were conducted to assess potential differences in children's behavior items across father cluster groups (see Table 1). Bonferroni post hoc findings revealed:

- *Responsive/didactic* fathers were more likely to have children whose behaviors were responsive, emotionally attuned and participatory with their father, as well as sophisticated in verbal and play behaviors.
- *Overbearing* fathers were more likely to have children who participated in activities with and were responsive to their fathers' behaviors, yet they were low in positive affect and unsophisticated in verbal and play behaviors.
- *Disengaged* fathers were more likely to have children who were disengaged and unresponsive to their fathers. They were engaged with the toys, but exhibited low levels of play and language behaviors.

Finally, differences in the three types of father interaction styles were examined based on their paternal childhood experiences of acceptance and rejection (see Table 1). Fathers' experiences of paternal acceptance were not associated with their interaction style. However, father interaction styles differed significantly based on their experiences of paternal rejection. Bonferroni post-hoc t-tests revealed that both "overbearing" and "responsive/didactic" types of fathers were more likely to perceive experiencing lower levels of paternal rejection than disengaged fathers.

TABLE 1

COMPARISON OF CHILD BEHAVIORS ACROSS TYPES OF FATHER INTERACTIONS

	Types of Fathering Interactions			
	Responsive/Didactic (*n*=24)	Overbearing (*n*=16)	Disengaged (*n*=17)	F ratios (df =2)
Child Behavior Items	*M*(SD)	*M*(SD)	*M*(SD)	
Positive affect	3.96(.75)	2.88(1.15)	3.06(1.08)	7.25**
Negative affect	1.67(.76)	2.06(.93)	1.76(.83)	1.12
Emotional regulation	4.29(.91)	3.94(1.18)	3.71(1.21)	1.51
Participation with father	4.04(.81)	3.38(1.20)	2.76(.75)	9.70***
Responsiveness to father	4.00(.86)	*3.75(.93)*	3.00(.79)	6.76**
Emotional attunement	3.63(1.10)	*2.69(1.20)*	1.76(.75)	16.15***
Involvement with toys	4.46(.66)	3.75(.78)	3.76(.97)	5.42**
Persistence	3.96(.80)	3.31(1.01)	3.00(1.12)	5.28**
Language use	3.46(1.10)	2.50(.81)	2.47(1.13)	6.11**
Language style	3.38(1.14)	1.88(.62))	2.47(1.07)	11.44***
Symbolic play	2.83(1.01)	1.69(.48)	1.88(.99)	9.84***
Paternal Childhood Experiences				
Acceptance Scale	22.17(6.07)	24.13(4.00)	20.94(6.24	1.34
Rejection Scale	7.67(3.47)	6.69(1.89)	9.76(2.28)	5.43**

**$p<.01$. ***$p<.001$.

Qualitative Analyses

To examine men's feelings toward and perceptions of their fathers' involvement with them during childhood, three groups of fathers were chosen based on their style of interaction with their children. The total subsample comprised 18 transcripts: (a) six men from the responsive/didactic group, (b) six men from the overbearing group, and (c) six men from the disengaged group.

Responsive/Didactic fathers typically expressed feelings of warmth and adoration toward their fathers. Statements from fathers such as "my dad was a wonderful guy to have growing up" and "my father was always there for us" encompassed the majority of the interviews. However, there were two fathers who expressed feelings of anger and disappointment toward their fathers' poor involvement with them during childhood. One man expressed disappointment at his father leaving his family during his childhood, stating, "instead of leaving, he should've stayed there." However, he still had positive memories of his father, asserting, "he was really into us, that's why I say all my love is for him and my moms." The other articulated pride in his fathers' ability to change and improve his life, stating:

> …even though he didn't live with me for most of my childhood, the interaction that I did have with him is just very prominent in mind that I can recognize qualities in myself that are through him…he's a good man, he really is good.

Thus, while acknowledging his fathers neglect as a child, he was also able to move forward and recognize his father's current strengths.

The majority of men perceived their fathers as "being there" physically, financially, and emotionally. One father replied, "he supports me, he supports me, you know, he supports me all the way:" Four men reportedly want to parent similarly to their fathers, making comments such as, "I really liked his approach at dealing with us when we did things wrong or uh trying to teach us something. It was a very gentle approach, and uh I try to carry it over…" Two men want to parent differently from their fathers, as one stated:

> …I feel like a lot of the thing or a lot of reasons that he gave for not being in my life, I feel like they were excuses…anything that's important in your life, you make it priority…so you should make that the same priority with your children.

All men expressed their desire to nurture their children with some subtle differences from what they received from their fathers, such as being more involved academically and providing more structure in their child's life.

Overbearing fathers, similar to responsive/didactic men, frequently expressed feelings of warmth and respect toward their fathers in statements such as, "he was my hero" and "I had a lot of respect and admiration for my father." However, half the men also expressed some fear toward their fathers and two men expressed anger/disappointment with their fathers. One man was angry because his father was not around much, and another was angry because his father was emotionally abusive toward him. However, both men expressed forgiveness toward their fathers' behaviors, with one stating, "it used to make me angry, but I got over that. It takes some time, though." Their fathers had also changed, becoming more involved in their lives, as one father replied, "he's there whenever I need him." A sense of pride is implied in these statements; pride in that their fathers had grown over time to become more a supportive parent.

The majority of men perceived their fathers as being physically available and financial providers for the family. A few men saw their fathers as playmates and/or nurturing, taking their sons for trips in the countryside and the beach or just "hanging out" with them. However, most wished their fathers' were more nurturing and supportive, as one man stated, "he was rough with me." When the men were asked about the kinds of things that their fathers did with them that they would do with their own children, one answered, "The same things that he use to do for me, I'd do for [child], but I think I'd take care of her better…I'll see her more often, I think...I'll take responsibility for her more." Thus, the fathers expressed a commitment to be available for their children and to be financial providers as their fathers had done for them, but unlike their fathers, they were determined to also provide more "quality" time with their children.

Disengaged fathers frequently expressed feelings of anger and/or indifference toward their fathers. Comments such as "I didn't know my father and what I knew, I don't like," and "my father was an unfit father" typify the responses these men had. Only one man, who lost his father at a young age, expressed feelings of warmth when speaking about his father, stating, "I loved everything that he did for me while he was alive. He was always there for me." Sadness could also be discerned from his remarks, as he stated, "you know [he did] all what a father should have done with his son during the time he was around, basically."

The majority of men felt their fathers' spent little time with them and did almost nothing with or for them, except for taking them on some outings, such as fishing trips. Several men described their fathers as being emotionally or physically abusive, frequently due to their alcohol/substance use. One father described his abuse, stating:

> ...I try to go to sleep before he'd get home, but that still didn't help. I could be asleep and he'd beat us out to sleep. I mean while we sleep, all you feelin' are these belts and switches hittin', y' know.

All men, except for the man whose father died during childhood, vowed to parent their child completely different from their father. Sentiments such as this were expressed by one father, who when asked what he would differently from his father replied, "...I plan to do the opposite." Similar to the other two groups of men, disengaged fathers expressed their desire to spend more time and more "quality" time with their children, unlike what their fathers had done.

Conclusions

In this study of inner-city, minority fathers, three meaningful types of fathering interactions were identified. Responsive/Didactic--these fathers demonstrated great awareness and responsiveness to children's emotional needs. They were flexible, sensitive to appropriate teaching moments and ways to engage their children in play without being overtly achievement-oriented. This parenting style appeared to be positively associated with children's social and cognitive abilities. Overbearing--these fathers were driven to teach their children skills, however, they were highly structured and primarily intrusive during their engagements. These overly controlling fathers appeared to diminish children's exploratory and communicative initiatives. Disengaged--these fathers were typically uninvolved with and unresponsive to their children. Their children were also unresponsive to them and only moderately involved with toys in a rudimentary and unsophisticated manner. This is not to say that children are passive recipients of fathering. Children who exhibit sophisticated language and play might promote sensitive, didactic interactions in their fathers. Similarly, children who are less capable might be less rewarding social partners, thereby compromising the quality of their fathers' engagements.

While a majority of the men were actively engaged with their children and almost half were responsive and didactic, nonetheless, there was a group of men who were less engaged with and sensitive to their children. This was linked, in part, to childhood experiences of paternal rejection. However, the story is more complex as there were also fathers who faced adverse childhood histories, but were able to rise above these negative experiences and provide responsive interactions with their children. In listening to men's voices about their paternal childhood experiences in relation to their own parenting, regardless of their feelings toward and perceptions of the quality of their fathers involvement, all men expressed a strong commitment to "be there" emotionally and physically for their children.

These findings might contribute to designing effective prevention-intervention programs to more appropriately address the needs of a broader range of fathers and their families than current studies allow. Taken as a whole the findings suggest that, while many low-income men are absent in their children's lives (Marsiglio, 1987), fathers who are involved with their children, can and do interact with them in a variety ways--many nurturing and didactic. Furthermore, the findings also support the notion that fathers' childhood experiences of paternal rejection negatively related to the quality of their parenting interactions. However, in order to more fully appreciate how these experience shape fathers' interactions and involvement with their children, additional variables should be considered (e.g., the quality of fathers' childhood relationships with their mothers and their current relationships).

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RELATIONS AMONG MOTHER AND HOME VISITOR PERSONALITY TRAITS, RELATIONSHIP QUALITY, AND AMOUNT OF TIME SPENT IN HOME VISITS

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Over the past several decades, home visiting models have been developed in response to needs of low-income families with infants and toddlers. The goal of home visiting programs is to promote positive family and child outcomes through the delivery of services in families' home environments. Research has suggested that regular, frequent visits result in more benefit to families in poverty than less intensive services (Gomby, Culross & Behrman, 1999). Yet, in a variety of programs, home visits fall short of the number prescribed by the program design (Barnard, 1998; Daro & Harding, 1999).

Some investigators and practitioners argue that the quality of relationships that develop between parents and home visitors is central to home visiting (Klass, 1996; Wasik, Bryant, & Lyons, 1990). Although no known investigations have empirically examined home visitor-parent relationship quality as it relates to home visiting, evidence from other helping relationships may be instructive. Theory and research on the factors promoting successful outcomes from counseling and psychotherapy identify client-therapist relationship quality as critical. In particular, client-therapist agreement on therapy goals and strategies and personal feelings for each other have been linked to satisfaction with therapy and with successful therapy outcomes (Bordin, 1979; Horvath & Greenberg, 1989). Similarly, Kiesler and Watkins (1989) found positive associations between patient-therapist interpersonal complementarity and both party's perceptions of their working relationship.

Because personality traits index characteristic ways of thinking about and reacting to people and situations, have relatively high heritability coefficients, and appear to be stable over many years (Caspi, 2000; Tellegen, Lykken, Bouchard, Wilcox, Segal & Rich, 1988), a number of researchers have investigated relations between personality traits and close relationships. In particular, higher-order positive emotionality (a combination of tendencies to experience positive emotional dispositions, to enjoy closeness to others, to want to make positive impacts on others, and to be perseverant and willing to work hard to achieve mastery) predicts outgoing, friendly interpersonal styles and high relationship satisfaction in married and dating couples. Negative emotionality (a combination of aggressive, alienated, and stress-prone tendencies), on the other hand, predicts a propensity to experience negative moods and to be involved in conflictual couple relationships (e.g., Karney & Bradbury, 1997; Larsen & Ketelaar, 1991; Watson, Hubbard & Wiese, 2000).

Evidence linking personality with relationship quality, when combined with evidence showing the importance of client-therapist liking and trust for the success of helping relationships, suggests that it may be useful to explicitly examine links between mothers' and home visitors' personality traits, home visitors' feelings about the relationship, and time spent in home visits. Individuals with personalities high in negative emotionality may have difficulty sustaining the type of positive relationship that has been advanced as fundamental to successful home-visiting models, whereas individuals high in positive emotionality may find it easy to establish and sustain the requisite trust and interpersonal coordination. Accordingly, we hypothesized that home visitors' feelings about their relationships with individual mothers mediates connections between home visitors' and mothers' personality characteristics and time spent in home visits. In other words, we expected to see that home visitors' and mothers' personality traits predict relationship quality, which, in turn, predicts home visiting time.

Because individual personality traits give a more specified understanding of personality-home visiting associations than superfactors, we examined relations between *components* of the Positive Emotionality and Negative Emotionality superfactors and relationship quality and amount of home visit time. The personality instrument administered to participants was Tellegen's (1982) Multidimensional Personality Questionnaire, form NZ (MPQ). We were interested in the Stress Reaction, Alienation, Social Potency, Well-Being, Social Closeness, Achievement, and Control subscales.

The Stress Reaction scale measures an individual's tendencies to worry and to feel nervous and vulnerable in everyday situations. The Alienation scale indexes the individual's propensity to view others with suspicion and mistrust. High Social Potency scores indicate propensities to assume leadership roles and to desire to influence others. High Well-Being scorers are disposed toward cheerfulness and seeing positive aspects of life. High Social Closeness scores denote propensities to enjoy being with people and to turn to people when comfort is needed. The Achievement scale measures tendencies to enjoy demanding work and to be persistent. The Control scale assesses planfulness, reflectiveness, and cautiousness.

We hypothesized that mother-home visitor relationship quality and time spent in home visiting would be negatively associated with home visitors' and mothers' scores on the Stress Reaction and Alienation scales, and positively associated with their scores on the Social Potency, Well-Being, Social Closeness, Achievement, and Control subscales. Stress Reaction and Alienation are included in the higher-order Negative Emotionality superfactor (Tellegen & Waller, in press). Following from the above-mentioned findings that negative emotionality is associated with difficulty in establishing and maintaining intimate relationships, we reasoned that it may also predict problems in other types of relationships, such as those between home visitors and mothers. Similar reasoning was behind our hypothesis that home visitors' and mothers' Well-Being and Social Closeness scores would be positively associated with relationship satisfaction and time spent in home visits; the research evidence reviewed above points to positive relations between positive emotionality (of which Well-Being and Social Closeness are components) and relationship satisfaction.

In addition, we hypothesized that home visitors' and mothers' Social Potency and Achievement scores would be positively associated with relationship quality and time spent home visiting. We reasoned that home visitors with these personality tendencies would want to meet program performance standards, would want to help (i.e., influence) families achieve their goals, and would be willing to dedicate time to this effort. We expected the same of mothers with these traits inasmuch as they might view home visits as a vehicle for personal progress. Similarly, we expected Control to be positively associated with relationship quality and home visit time because propensities to be planful and reflective would seem to predict thoughtful organization and accomplishment of work-related tasks (including the relationship building and investment of time necessary for home visit success).

Method

Participants

The participants included 41 African-American, first-time mothers. The mothers were part of a larger study that included 82 mothers who were enrolled in an Early Head Start program in a large, Midwestern city. The current sample was limited to the mothers with complete data on the instruments used in the present analyses. Compared to mothers not included in the present study, the mothers in our sample did not differ on any of the personality subscales except Social Potency, in which case mothers in the sample scored significantly higher than mothers excluded due to incomplete data. (However, Social Potency was unrelated to time spent in home visits.) Most of the mothers were in their late teens or early 20s (M = 19.3 years, SD = 3.1) and had limited education (50 percent did not have a high school degree or GED). The majority of mothers (96 percent) were unmarried and received some type of public assistance (e.g., Medicaid/Medicare [85 percent]; food stamps [50 percent]; AFDC [31 percent]; WIC [88 percent]). Mothers were served by one of five home visitors, four females and one male.

Procedure

Research assistants administered a battery of instruments to mothers, including the personality questionnaire, in their homes when mothers' infants were 6 or 12 months old. (Time of administration was unrelated to personality scores.) After each home visit, home visitors recorded the length of the visit. Three years after the program began, home visitors completed questionnaires tapping their own personality characteristics and perceptions of the quality of their relationships with each mother in their caseload.

Measures

Personality. The Multidimensional Personality Questionnaire, Form NZ (MPQ) (Tellegen, 1982) is a measure of "normal" personality characteristics. The MPQ has 10 subscales that tap affective, cognitive, and behavior dimensions of respondents' personalities. Higher scores indicate higher levels of the specified personality dimension. For the current study, we used seven of the scales: Stress Reaction (alpha = .89), Alienation (alpha = .82), Social Potency (alpha = .60), Well-Being (alpha = .81), Social Closeness (alpha = .78), Achievement (alpha = .56), and Control (alpha = .68). (All alphas are based on mothers' scores.)

Working Alliance. The Working Alliance Inventory (WAI) (Short form), developed by Horvath and Greenburg (1989), assesses the working relationship between a client and clinician. For the present study, the WAI wording was modified to refer to the relationship between parents and home visitors. The WAI emphasizes the level of mutuality between the parent and the home visitor Although the WAI is comprised of three subscales, we used only the Bond subscale because it most adequately captures perceived relationship quality. *Bond* measures mutual attachment between the mother and home visitor, including trust, acceptance and confidence (sample item: I feel that [mother's name] appreciates me"). Responses range from 1 (never) to 7 (always) with higher scores indicating higher quality relationships.

Participation in home visiting. Participation in visits, operationalized as the mean number of minutes spent with each mother per month, based on three months to two years of visits, served as the dependent variable. Mean participation time was 106 minutes (SD = 42.9). Participation information was obtained by examining home visit records for each family.

Results

A primary goal of the present study was to test hypotheses that the quality of mothers' and home visitors' relationship mediates links between personality characteristics and home visit participation. Support for the hypothesis of statistical mediation would require evidence that (a) personality and home visit participation are significantly related, (b) personality and relationship quality are significantly related, and that (c) the relation between personality and home visit participation is substantially reduced when relationship quality is partialled out (Baron & Kenny, 1986).

To test our hypotheses, we had to consider the fact that, because each home visitor was assigned to multiple mothers, data were nested (i.e., structured hierarchically with mothers nested within home visitor caseloads). It is recommended that an estimate of within-group similarity relative to between-group similarity be calculated when data are arranged in nested fashion. In the present case, within-group similarity refers to homogeneity within caseloads and between-group similarity refers to homogeneity between caseloads. The question asked, in other words, is whether mothers assigned to the same home visitor are more similar to one another than mothers assigned to different home visitors. Therefore, an intraclass correlation coefficient (ICCs; *p*) was computed to estimate the proportion of variance in participation scores accounted for by the home visitor level. The results indicated that the intraclass correlation coefficient for participation scores was .07, suggesting there was more similarity in maternal participation scores within caseloads than between caseloads. Stated differently, mothers in the same caseload had more similar participation scores than did mothers with different home visitors. This result provided evidence that an analytic method that accounts for structured data should be used. Consequently, hierarchical linear modeling (HLM) was used. HLM is a statistical procedure that takes such complex patterns into account (Bryk & Raudenbush, 1992).

Maternal and Home Visitor Personality as Predictors of Home Visit Participation

A series of random effects HLM models were conducted to investigate whether maternal and home visitor personality variables predicted home visit participation rates. Specifically, seven separate models were run, one for each personality subscale. In each model, maternal personality score was a level 1 variable and home visitor's personality score was a Level 2 variable.

The findings indicated that four maternal and two home visitor personality characteristics were significant predictors of participation. Specifically, maternal personality-based achievement striving, F (1, 34) = 4.93, p = .03, and desire for control, F (1, 35) = 5.62, p = .02, were negatively related to home visit participation. Maternal Stress Reaction, F (1, 34) = 5.24, p = .03, and Alienation, F (1, 34) = 6.87, p = .01, on the other hand, were positive predictors of participation. Maternal Social Potency, Well-Being, and Social Closeness were unrelated to participation. With regard to level two variability, both home visitors' higher Well-Being scores, F (1, 34) = 7.18, p = .01, and lower Stress-Reaction, F (1, 34) = 3.06, p = .08, scores predicted increased home visit participation. Home visitor Alienation, Social Potency, Social Closeness, Achievement, and Control scores were unrelated to participation. For subsequent analyses involving personality, only subscales that were significantly related to participation were used.

Maternal And Home Visitor Personality As Predictors Of Relationship Quality

Next, random effect HLM models were conducted to test the association between the four maternal personality traits that were related to participation (specifically, Achievement, Control, Stress Reaction, and Alienation) and home visitors' ratings of the quality of the relationships between themselves and mothers (i.e., the Bond subscale of the WAI). Results indicated that maternal Stress Reaction, F (1, 33) = 4.2, p = .05, and Alienation, F (1, 33) = 6.45, p = .02, were positively related to home visitor's assessment of relationship quality.

In a similar manner, HLM models were also run analyzing the relationship between the two home visitor personality characteristics that were related to participation (Well-Being and Stress Reaction) and relationship quality. No significant effects were found. Thus the hypothesis that relationship quality mediates links between *home visitor* personality and participation was not supported.

Relationship Quality As A Mediator Of Maternal Personality-Participation Links

Tests of the hypothesis that relationship quality mediates links between *maternal* personality and participation required one more set of analyses. This final step in testing statistical mediation required that maternal personality and home visitor relationship quality be run as simultaneous predictors of participation. Two separate models were conducted, one for maternal Stress Reaction and one for maternal Alienation.

In both models, maternal personality and relationship quality were no longer significant predictors of participation. The reduction in the significance of the relation between the independent and dependent variables when the mediator was added to the model would seem to suggest that statistical mediation exists. However, because the mediator was also not significantly related to participation, such a conclusion cannot be reached. We had to conclude that relationship quality did *not* mediate relations between maternal personality and home visit participation.

Though the results showed no mediational effect, we thought it important to further explore the data by testing whether home visitors' assessment of relationship quality, when entered separately, predicts participation. Results indicated that home visitor reports of the relationship were indeed related to home visit participation scores, F (1, 40) = 6.82, p = .01. Given that maternal personality and relationship quality were both significant predictors of participation when entered separately, it seems likely that low statistical power made it difficult to detect significant results when they were entered simultaneously.

Discussion

In response to low participation rates in home visit programs, and a dearth of research explaining this phenomenon, the purpose of the current study was to examine personality and mother-home visitor relationship quality as predictors of home visit participation. We speculated that the quality of the home visitor-mother bond would mediate associations between personality and home visit participation. Though the findings did not support our mediational hypotheses, they did indicate that mother and home visitor personality are linked to home visit participation, maternal personality predicts mother-home visitor relationship quality, and that mother-home visitor relationship quality is related to home visit participation.

Four maternal and two home visitor personality characteristics predicted home visit participation. Specifically, maternal personality traits reflecting orientations toward control and achievement were negatively related to home visit time. Conversely, maternal tendencies to be stress-prone and to feel vulnerable and/or taken advantage of (i.e., high Stress Reaction and Alienation scores) were positive predictors of participation scores. Interestingly, home visitor ratings of bond quality were also positively linked to maternal Stress Reaction and Alienation.

One explanation for these findings may be related to how home visitors perceived the needs of mothers in their caseloads. Perhaps home visitors thought home visits are especially important for mothers who are low in planfulness and achievement-striving and who are highly stressed because the services come to the mothers; they do not have to exercise as much initiative to obtain them. Further, if home visitors perceived planful, achievement-oriented mothers as more able to meet their own needs, they may have made fewer attempts to reschedule cancelled visits or to reach mothers when work schedules preclude easy access. Perhaps home visitors tended to think that such mothers would call when they needed visits. Less planful, achievement-oriented mothers might have been perceived as needing the home visitors' assertive initiation.

Along the same lines, mothers who showed more negative emotionality (higher Alienation and Stress Reaction scores) may have elicited reactions from home visitors that resulted in more and longer visits. Stress-proneness combined with (or partially caused by) the stressors inherent in poverty circumstances would likely lead to "crises" needing a response. In this situation, these mothers may have presented as more needful to home visitors, thereby contributing to higher participation rates. Our findings that maternal Stress Reaction and Alienation scores predicted relationship quality support this notion. With more issues to work on, highly stress-prone mothers may have been more likely to draw the home visitors into personal relationships.

Interestingly, some mothers appear to have been aware of the connection between perceived neediness and provision of services. One mother in this study who was also a participant in a related qualitative study answered our question about Early Head Start by telling us that, "Well, it's all good but I think you really have to be in a position where you need a lot of help to really get the full benefit of the program." An alternative explanation comes from anecdotal data that suggest home visits are more difficult to complete with working mothers. It would seem plausible that mothers who are high in control and achievement-orientation, and low in Stress Reaction and Alienation, are more likely to be have sustained employment than are other mothers. The logistical challenge of scheduling visits with such mothers, who are perhaps more likely to work long hours, may interfere with home visiting. One mother who was rarely contacted by her home visitor seemed to accept the home visitor's explanation that she was difficult to reach and didn't need much help anyway. This mother told us that, "I don't see [my home visitor] that much. Right now I don't have time to see her. I've been working overtime. I mean she helped me when I was looking for a job. I don't really need any help with this other stuff." The "other stuff" included parenting and college enrollment issues. Along similar lines, Cole, Kitzman, Olds & Sidera (1998) found that mothers with more problematic intrapersonal skills received more visits from nurse home visitors than higher-functioning mothers. Future studies should investigate the extent to which the amount of stress, or extent of unmet need, experienced by mothers moderates relations between personality and home visit participation.

Home visitor characteristics also helped explain home visit participation rates. In terms of emotionality, the pattern was opposite that of mothers. Home visitor satisfaction with life (higher scores for Well-Being) and low levels of irritability (lower scores for Stress-Reaction) were positively associated with home visit participation. Perhaps these characteristics are related to home visitors' skills in establishing relationships. In addition, it may be that a personality given to positive emotionality is especially important for social service providers whose work takes them into high stress situations. Individuals prone to negative emotionality may find the difficult circumstances of parents such as those in our low-income sample overwhelming. Lower home visit participation may reflect conscious or unconscious desires on the part of home visitors to avoid upsetting themselves. It may be easier for individuals prone to more positive emotionality (as reflected in high Well-Being and low Stress-Reaction scores) to cope with these situations.

Though home visitor assessment of relationship quality did not mediate relations between personality and participation, the link between home visitor assessment of relationship quality and participation merits discussion. The finding is in accord with research showing positive associations between client-therapist perceptions of ability to connect and satisfaction with psychotherapy (Bordin, 1979; Horvath & Greenberg, 1989). It also supports the notion that the success of home visiting interventions depends on the bond between home visitors and parents (Barnard, 1998; Klass, 1996; Wasik et al., 1990).

Two implications for practice flow from this study. First, our findings suggest that the needs of mothers who seem to have fewer problems than other mothers may be overlooked in home visiting programs. Particularly in low-income populations, even mothers who are functioning relatively well are likely to benefit from assistance with a variety of life issues, including those related to child development and parents' education and employment. While some families may need more service than others, staff should be careful to attend to the needs of families who are not in crisis.

In addition, because home visitors indicating overall higher well-being and less stress tended to have higher participation rates than their counterparts, the issue of work environment needs to be addressed. Perhaps program supervisors and administrators need to attend to the stressful conditions home visitors are exposed to and place emphasis on minimizing such conditions and/or helping home visitors cope with the inevitable stressors of their jobs. A system of reflective supervision wherein the home visitor has a supportive relationship with the supervisor may decrease the stressful impact of working with families in poverty. Implementing an employee feedback system whereby home visitors could comment on aspects of their work conditions that induce stress and that, conversely, are conducive for productivity may provide a helpful beginning. Such in-house evaluations have been recommended by other researchers of home visiting programs (The David and Lucile Packard Foundation, 1999).

A limitation of our research concerns the number of analyses conducted. According to Bonferroni's correction, only *p* values < .01 should be considered significant. However, given the exploratory nature of our study, we consider it more important to possibly risk Type 1 error than to lose the potential for important findings via Type 2 error. Another limitation is related to the small number of mothers, and especially home visitors, in our sample. Future research on larger samples may help determine, for example, if the lack of support for our mediational hypotheses was due to low statistical power. However, the fact that some reliable results were found despite the sample size suggests that those predictors that did emerge as significant are indeed related to home visit participation.

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PREDICTORS AND OUTCOMES OF PROGRAM PARTICIPATION, AND CORRELATES OF CHILDREN'S COGNITIVE DEVELOPMENT AT THE EDUCATIONAL ALLIANCE'S EARLY HEAD START

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Background And Research Questions

This is a brief summary of predictors and outcomes of participation in the Early Head Start (EHS) program of The Educational Alliance in New York City. Correlates of children's cognitive development are also explored. The Educational Alliance, a Settlement House serving families on Manhattan's Lower East Side for over 100 years, provided center-based EHS services at two sites:

- The EHS center at the Educational Alliance.
- Teen-Aid High School—a New York City Board of Education program for pregnant and parenting teens.

Many families randomly assigned to EHS did not actually participate in the program—42 percent of children assigned to EHS were rated by program staff as having "poor attendance" at the EHS childcare centers. Two research questions thus emerged from this context:

- What family characteristics predicted EHS program participation?
- What child and family characteristics were affected by EHS program participation?

In addition to exploring outcomes of participation, we were also interested in exploring correlates of children's cognitive development, as a first stage toward modeling pathways to gains in cognitive development. This inquiry was guided by the final research question to be addressed in this study:

- What child and family characteristics were associated with children's cognitive development?

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Method

Research Participants

Participants included all those families who were randomly assigned at either Teen Aid or the Educational Alliance (N = 141). Demographic characteristics of the sample collected at baseline are presented below in Table 1.

TABLE 1
SAMPLE FREQUENCIES

	Frequency	Percent
Ethnicity		
African-American	59	48%
Hispanic	51	41%
Asian	8	6%
Caucasian	2	2%
Mixed	3	2%
Caribbean	1	1%
Did not identify	17	
Family's country of origin		
Puerto Rico	22	16%
Dominican Republic	3	2%
Mexico	4	3%
Caribbean Island	7	5%
USA	89	61%
China	6	4%
Indian	1	1%
Guatemala	1	1%
Ecuador	3	2%
Panama	1	1%
Central American Country	2	2%
Puerto Rico/Dominican	1	1%
West Indian	1	1%
Mother's age at child's birth		
14-15	10	7%
16-17	42	31%
18-19	24	18%
20-29	31	30%
30-39	16	12%
40(+)	2	2%
Primary language in the home		
English	109	77%
Spanish	25	18%
Chinese	6	4%
Other	1	1%

Marital Status		
Single	67	64%
Live with partner or Married	31	29%
Separated or Divorced	5	5%
Widowed	1	1%
Educational Status		
Some Junior High School	2	2%
Graduated Junior High School	7	7%
Some High School	64	68%
Graduated Junior High School	6	6%
GED	2	2%
Some College	7	7%
College Graduate	6	6%
Status of Baby's Father		
Residential	28	32%
Not residential, but involved with child and mother	33	37%
Not residential, but involved with child only	4	5%
No contact/not involved	23	26%
Social Services		
AFDC	29	36%
Medicaid	77	82%
Food stamps	25	31%
WIC	63	78%
SSI/SSD	9	11%

Note: Due to missing data, not all categories total to 141

Program Participation Ratings

EHS staff rated families on two dimensions of program participation—child attendance at the EHS childcare centers and parent involvement with EHS social service staff. Ratings were based upon a four-point scale. Consistency of a children's attendance was rated as "Poor," "Fair" "Good" or "Excellent." Ratings of how often parents worked with EHS social services staff ranged from "Not at all" to "Occasionally" to "Fairly Often" to "Regularly." Ratings were generated at the end of the completion of the program. For this analysis, children's attendance was collapsed into one of two categories—"Fair to Excellent Attendance" or "Poor Attendance."

For the analysis of predictors of program participation, only those randomly assigned to EHS were included (N = 67). For the analysis of outcomes of participation, those randomly assigned to EHS, but rated "Poor Attendance," were excluded. Thus in the analysis of outcomes of participation, the "Fair(+) Attendance" variable contrasts EHS families whose children had fair to excellent attendance (N = 39) with the control group (N = 71). The rationale for this grouping was to compare children who participated in the EHS program with those who did not.

Table 2 summarizes children's attendance and parent involvement by site. As can be seen in the final row of Table II, parent involvement was almost twice as great at the Teen Aid site, compared to the Educational Alliance site (51 percent versus 28 percent). This difference was likely due to the program setting. Teen Aid mothers were attending high school on-site, thus they were available to work with the EHS social worker most school days.

TABLE 2
CHILD ATTENDANCE AND PARENT INVOLVEMENT BY PROGRAM SITE

	Frequency	Percent
Total Randomly Assigned	141	100%
Randomly assigned through the Educational Alliance	77	55%
Randomly assigned through Teen Aid	64	45%
Total assigned to EHS	70	50%
Total assigned to control group	71	50%

TABLE 2A
CHILD ATTENDANCE AND PARENT INVOLVEMENT BY PROGRAM SITE

	Combined Sites	Ed. Alliance	Teen Aid	Combined Sites	Ed. Alliance	Teen Aid
Child Attendance	67[1]	36	31			
Poor	28	14	14	42%	39%	48%
Fair	11	3	8	16%	8%	28%
Good-Excellent	28	19	9	42%	53%	32%
Parent Involvement	67[1]	36	31			
Not at all	22	14	8	33%	39%	26%
Occasionally	19	12	7	28%	33%	23%
Fairly Often-Regularly	26	10	16	39%	28%	51%

[1] Staff unable to rate 3 families

Instruments

Dyad Ratings

Children and their caregivers were videotaped playing together in their homes. Observations were conducted during home visits when children were six, fourteen, twenty-four, and thirty-six months old. Dimensions mothers were rated on included positive affect, positive touch, positive verbal reinforcement, responsiveness, emotional attunement, participation with child, structuring, overall consistency, language use, caregiver, quality of language, use of teaching loop, achievement orientation, inventiveness with toys, and sophistication of play. Factor analysis demonstrated that these dimensions loaded on a single factor, termed "Maternal Didactic Responsiveness". Dyadic interaction was rated on three dimensions—mutual enjoyment, mutual communication, and reciprocal interaction. Factor analysis demonstrated these dimensions loaded on a single factor, termed "Dyad Mutuality". Ratings of children's language use and communication abilities formed the "Child Quality of Communication factor". Children's positive affect and positive touch formed the "Child Positive Affect factor".

Scale Scores

Measures from the national evaluation collected when children were 14 and 24 months were included in the analyses. Additionally, Bayley Mental Development Index (MDI) scores from 36 months were also included. Scales and observational measures from our local research study were administered when children were six, 14, 24, and 36 months old. Table 3 reports on the psychometric properties of scales in our local survey that were included in this report.

Results

Predictors of Participation

All scale scores and dyadic observation measures included in our six-month assessment were tested against the two measures of EHS program participation—child attendance and parent involvement ("Fair to Excellent Attendance versus Poor Attendance" and "How Much Parents Worked with EHS Social Service Staff"). These data may not have constituted true baseline measures for all families, as a few children began attending the EHS center-based care from the age of 4 months; but they represent our earliest data from our families.

As can be seen in Table 4, exposure to violence significantly lowered the degree to which families participated in the program. Cultural values also affected participation. More traditional cultural values were associated with lower program participation. These findings give rise to the question of whether cultural values might have been associated with exposure to violence. Follow-up analyses showed no significant correlation between cultural values and exposure to community or domestic violence.

Fathers—both in mothers' family of origin, and in babies' current family—played a significant role in affecting program participation. Current father involvement predicted higher attendance and involvement with social service staff. Harsh fathering that mothers experienced

TABLE 3
INTERNAL CONSISTENCY OF LOCAL MEASURES[1]

Psychosocial Variables – Support, Psychological Well-Being	hronbach's Alpha
Practical Support – Vaux Social Support Record	.74
Emotional Support– Vaux Social Support Record	.62
Advice and Guidance Support– Vaux Social Support Record	.74
Support from EHS: All staff	.88
What I Got from EHS: Growth as a Parent	.95
What I Got from EHS: Personal Growth	.92
What I Got from EHS: Family Program Bond	.96
What I Got from EHS: Child Development	.93
Working Alliance Inventory Total (WAI)	.97
Conflict in Approach – WAI	.78
Goal – WAI	.97
Emotional Bond – WAI	.96
Merhabian Empathy Scale	.83
Parenting Stress Inventory (PSI): General	.88
Parenting Stress Inventory (PSI): Child	.86
Maternal Efficacy Scale	.92
PTSD (Impact of Events Scales)	.91
Center for Epidemiological Studies-Depression scale (CES-D)	.86
Parental Acceptance and Rejection Questionnaire (PARQ): Mother Was Loving/Accepting	.95
PARQ: Mother Was Harsh and Rejecting	.95
PARQ: Father Was Loving/Accepting	.97
PARQ: Father Was Harsh and Rejecting	.94
Parent Stress Inventory (PSI): General Stress	.88
PSI: Stress Related to Parenting	.95
Parenting	
Maternal Self Rating: Didactic	.86
Maternal Self Rating: Nurturing	.83
Maternal Self Rating: Autonomy Support	.78
Mother's Rating of Child's Father: Didactic& Nurturing	.98
Mother's Rating of Child's Father: Autonomy Support	.85
Mother's Rating of Ideal Father: Didactic& Nurturing	.98
Mother's Rating of Ideal Father: Autonomy Support	.80
Modernity: Traditional Values/Respect for Authority	.77
Modernity: Value children having their own point of view	.77
Modernity: Belief that children will naturally misbehave unless taught to behave	.55
Child Development 36 mo	
Social Skills Rating System (SSRS)-Positive Social Behaviors	.95
SSRS-Negative: Disrupts, Aggressive, Loner	.86

[1] References for all scales are included at the end of this article

TABLE 4
ANTECEDENTS OF EHS PARTICIPATION: PSYCHOSOCIAL VARIABLES ASSESSED WHEN CHILD WAS SIX MONTHS OLD
N = 20-40

Sample: Only families randomly assigned to EHS	**Fair (+) Attendance vs. Poor Attendance**	**Degree of Involvement With EHS Social Service Staff**
Exposure to Violence		
Total Community Violence Experienced: Past 5 Years	$-.41^{*}$	$-.32^{t}$
Total Domestic Violence Experienced: Past Year	$-.46^{*}$	$-.40^{*}$
Witnessed/Aware of Domestic Violence toward Others	-.39*	-.36t
Psychosocial Variables		
PARQ: Harshness/Rejection by Father (family of origin)	-.40t	
PARQ: Love/Acceptance by Father (family of origin)	.32t	
Maternal Efficacy		.44*
Cultural Variables		
Modernity: Belief that it is good for children to have their own point of view		.38t
Modernity: Belief that children will naturally misbehave unless taught to behave		-.47*
Support from Baby's Father		
Living With Partner (husband/living as married)	.36*	
Baby's Father is a Caretaker	.35*	.35*
Social Support from Baby's Father	.33t	

$^{*}p < .05$, $^{t}p < .1$

in their families when they were growing up was associated with lower attendance. Warm, accepting fathering was associated with higher attendance.

Measures of quality of parenting, quality of mother-infant interaction, maternal mental health, social support (except from baby's father), and the quality of the relationship between EHS mothers and their own mothers when they were growing up (family of origin) were not significantly associated with participation. Only correlations that reached at least a trend toward significance are reported in Table 4.

Outcomes of Participation

Measures tested as outcomes of participation included measures from the national evaluation that were collected when children were 14 and 24 months old, and 36 month Bayley

MDI scores, and measures collected in the local outcome research when children were 14, 24 and 36 months of age. Fourteen-month assessments may occur too early to be considered outcome measures. However, most families at the Teen Aid EHS site completed their tenure at Teen Aid High School before their children turned two years old. Thus for one of our two EHS centers, the 14-month assessment was often the last assessment that occurred during families intensive period of EHS participation. Therefore, we are including measures from the 14-month assessment in the table of outcomes presented below.

Children's cognitive development was associated with both program participation variables at each age milestone, as the MDI-Participation correlations below demonstrate. Moderately strong effects for participation on children's social development were also found (SSRS-Positive Social Behaviors). Moderately strong program effects on children's language were demonstrated by correlations between participation and the Vineland Communication Domain and the Child Quality of Communication dyad rating.

Parental domains significantly associated with participation included quality of parent-child interaction, quality of parenting, discipline strategies, parenting stress, psychological well-being, and social support. Table 5 presents correlates with program participation. Only correlations that reached at least a trend toward significance are reported.

TABLE 5
OUTCOMES OF PARTICIPATION: FAMILIES WITH FAIR-TO-EXCELLENT ATTENDANCE VERSUS CONTROL GROUP FAMILIES
N = 40-86

Sample: Families randomly assigned to EHS with "Poor Attendance" were excluded from this sample.	**EHS Fair (+) Attendance vs. Control Group**	**Worked with Social Service Staff**
Variables from the National Study (n = 70-86)		
Cognitive Development: MDI (Bayley) Scales		
MDI 36 mo	.32***	.25**
MDI 24 mo	.28*	.25*
MDI 14 mo	.37**	.31**
Parenting		
14 mo High chair: Warm	.30**	.19^{t}
14 mo High chair: Positive Regard	.25*	
14 mo High chair: Sensitivity	.32**	.22^{t}
24 mo Discipline: Prevent-Distract	.31**	.30**
24 mo Mild Discipline Only	.28*	.31**
14 mo Discipline: Prevent-Distract	.31**	.30**
24 mo HOME: Non-punitive		.25^{t}
14 mo Parent-Child Play	.21^{t}	.19^{t}
14 mo Reading at bedtime	.25*	
Mental Health		
14 mo Depression (CES-D)	-.27**	-.24*
14 mo Parent Mastery	.23*	.26*
24 mo Parental Stress (PSI)	-.30**	-.27*
24 mo PSI Parent-Child Dysfunctional Interaction	-.40***	-.36**
Variables from the Local Study (n=40-84)		
Dyadic Interaction (Coded from Videotaped Interaction)		
Maternal Didactic Responsiveness	.22^{t}	.23*
Dyad Mutuality	.27*	.30*
Child Quality of Communication	.29*	.28*
Child Positive Affect	.29*	.30*
Self-Rated Psychosocial Variables and Parenting		
Psychosocial 36 mo		
Practical Support	.28*	
Emotional Support	.25^{t}	
Advice and Guidance Support	.43**	33*
Empathy	.26*	
Parenting Stress	-.27*	-.26*
Maternal Self Rating: Didactic		.22*
Maternal Self Rating: Autonomy Support		.25^{t}
Mother Rated Child Development		
SSRS-Positive Social Behaviors	.42*	.38*
Vineland-Communication	.34^{t}	.35*
Vineland-Motor	.27^{t}	

** p < .01, * p < .05, ^{t} p < .1

Correlates Of Children's Cognitive Development

A wide range of variables demonstrated significant association with children's cognitive development, as indexed by MDI scores. The quality of parenting, the quality of parent-child interaction, parent psychological well-being, social support, quality of EHS program engagement, cultural values and other domains of child development all demonstrated significant correlations with MDI scores.

Observational measures of quality of parenting showed substantial associations with cognitive development at 24 and 36 months. Quality of parenting at six months (Maternal Language, Play, and Emotional Availability) was a fairly strong predictor of MDI scores at 24 months and 36 months. Similar findings were found for quality of parenting at 14 months. Maternal Rich Language (coded only at 14 months) was a moderately strong predictor of child cognitive development at 24 months. The high-chair parent-child observation measures from the 14-month national evaluation battery also demonstrated a pattern of correlations with cognitive development at all three age milestones.

The quality of parent-child interaction, as measured by Dyad Mutuality, was significantly associated with cognitive development at 24 and 36 months. Dyad Mutuality at six months was predictive of 36 month MDI. Dyad Mutuality at 24 months was associated with MDI scores at both 24 months and MDI 36 months. Dyad Mutuality at 36 months was associated with the 36 month MDI.

Self-rated parenting measures demonstrated a pattern of findings similar to the observational parenting measures. Mothers' ratings of their teaching (Maternal Self Rating: Didactic), nurturing (Maternal Self Rating: Nurturing) and Autonomy Support (Maternal Self Rating: Autonomy Support) were all associated with cognitive development at 36 months.

Father involvement was associated with children's cognitive development. Mothers' ratings of babies' fathers' autonomy support was significantly associated with cognitive development at 36 months. Mothers' reports of time fathers spent with their children and time spent playing, reading or talking to baby were associated with cognitive development at 14 months. Interestingly, there was a very strong relationship between how much mothers valued father involvement--Ideal Father: Didactic/Nurturing and Ideal Father: Autonomy Support—and cognitive development.

The relationship between children's cognitive development and the quality of their home environment was demonstrated by positive correlations between HOME observations (total HOME score) at 14 months and cognitive development at 14 and 24 months.

A variety of measures of social support were associated with child cognitive development. Total emotional support and advice and guidance support at 36 months were associated with 36-month MDI scores. Support mothers received from babies' fathers at 14, 24 and 36 months predicted 36-month MDI scores. Support from mother at 14 and 36 months was associated with 36-month MDI scores

Program involvement variables were associated with child cognitive development (only families randomly assigned to EHS were included in this analysis). Five program involvement variables—Social Support from EHS staff, "What I Got from EHS: Growth as a Parent," "What I Got from EHS: Family-Program Bond," "What I Got from EHS: Child Development," and the Working Alliance Inventory Goal Disagreement subscale (a negative measure of involvement)—were associated with cognitive development at 14 and 36 months. The stronger pattern of findings for 14 months is likely due to the fact that many families at the Teen Aid site completed their stay at the EHS center by the time their children were 14 months of age.

Measures of parent's emotional well-being were significantly associated with children's cognitive development. Symptoms of posttraumatic stress disorder yielded significant negative correlations with MDI scores at 24 and 36 months. Parenting stress was negatively associated with cognitive development at 36 months. Harsh, rejecting parenting by fathers, in mothers' families of origin, was negatively associated with cognitive development at all three age milestones. The quality of mothering in mothers' families of origin was associated with MDI scores at 14 and 24 months.

Other aspects of child development also demonstrated significant association with cognitive development. Social development showed a strong correlation with cognitive development (SSRS Positive Behaviors, Negative Behaviors; Vineland Social Domain). Other indices of social behavior, including negative behaviors with parent on observational measures also yielded significant correlations with cognitive development at 24 and 36 months. Mother's ratings of children's distractibility, difficult temperament, and difficult behavior were associated with lower MDI scores at 36 months. Children's health, as rated by their mothers, was associated with cognitive development at 36 months. As would be expected, language development was strongly associated with MDI scores.

Table 6 presents the magnitude and statistical significance of the correlates of children's cognitive development. All families in the study are included in these analyses. Only correlations that reached at least a trend toward significance are reported.

TABLE 6
CORRELATES OF CHILDREN'S COGNITIVE DEVELOPMENT
N= 31-104

	Cognitive Development at Age Milestones		
	MDI 14 mo	MDI 24 mo	MDI 36 mo
National Survey Variables (N = 50-104)			
Parenting			
14 mo High Chair: Warm		$.34^{**}$	$.28^{*}$
14 mo High Chair: Positive regard	$.25^{*}$	$.35^{**}$	$.34^{**}$
14 mo High Chair: Sensitivity		$.28^{*}$	
14 mo discipline-remove object	$.17^{t}$	$.22^{t}$	
14 mo HOME Total	$.26^{**}$	$.24^{*}$	
Mental Health			
14 mo Depression (CES-D)	$-.28^{**}$	$-.19^{t}$	$-.23^{*}$
14 mo Parent Mastery	$.17^{t}$		$.32^{**}$
24 mo Parental Stress			$-.26^{t}$
24 mo PSI Dysfunctional Parent-Child Interaction	$-.48^{***}$	$-.54^{***}$	$.43^{**}$
Quality Of Parent Child Relationship Dyad Ratings And Language Codes (N = 31-84)			
36 mo Dyad Mutuality			$.29^{**}$
36 mo Child: Participation with Caregiver			$.32^{**}$
36 mo Child: Low Emotional Regulation/Aggressive Behavior toward Caregiver			$-.24^{*}$
36 mo Child: Quality of Communication			$.40^{***}$
36 mo Child: Positive Affect			$.22^{*}$
24 mo Dyad Mutuality		$.43^{***}$	$.30^{**}$
24 mo Child Language Quality		$.53^{***}$	$.38^{***}$
24 mo Child: Low Emotional Regulation/Aggressive Behavior toward Caregiver		$-.31^{**}$	$-.22^{t}$
24 mo Child Persistence			$.24^{*}$
14 mo Maternal Language, Play, and Emotional Availability		$.36^{**}$	$.27^{t}$
14 mo Maternal Intrusiveness & Rigidity		$-.36^{*}$	
14 mo Maternal Rich Language Factor		$.42^{***}$	
6 mo Maternal Language, Play, and Emotional Availability		$.43^{**}$	$.46^{***}$
6 mo Dyad Mutuality			$.28^{*}$
Psychosocial and Parenting Variables from NYU survey (n = 31-66)			
Social Support: Ehs Program, Family, Baby's Father			
Support from all EHS staff1	$.25^{*}$	$.30^{*}$	
Working Alliance Inventory Goal Disagreement1			$-.39^{*}$
What I Got from EHS: Growth as a Parent1	$.35^{*}$		$.27^{t}$
What I Got from EHS: Family-Program Bond1	$.31^{t}$		
What I Got from EHS: Child Development1	$.36^{*}$		
36 mo Emotional Support			$.27^{*}$
36 mo Advice and Guidance Support			$.33^{**}$
36 mo Support from baby's father			$.27^{*}$
24 mo Support from baby's father			$.30^{**}$
14 mo Support from mother	$.35^{*}$		$.35^{*}$
14 mo Support from father			$.23^{t}$
14 mo Support from baby's father			$.26^{t}$

	Cognitive Development at Age Milestones		
	MDI 14 mo	MDI 24 mo	MDI 36 mo
Parent Mental Health			
36 mo PTSD symptoms (IES)			-.39***
24 mo PTSD symptoms (IES)		-.43***	-.37**
36 Parenting Stress—General (PSI)			-.39**
36 Parenting Stress--From Child (PSI)			-.32*
Family of Origin: Mother was Loving & Accepting	.48**		
Family of Origin: Mother was Harsh & Rejecting		-.30*	
Family of Origin: Father was Harsh & Rejecting	-.^{28t}	-.39*	-.39**
Parenting (Self-Rated)			
Maternal Self Rating: Didactic			.23^{t}
Maternal Self Rating: Nurturing			.20^{t}
Maternal Self Rating: Autonomy Support			.25*
Mother Rating of Father's Autonomy Support			.25*
Mother Rating of Ideal Father: Didactic/Nurturing		.^{28*}	.50***
Mother Rating of Ideal Father: Autonomy Support			.28*
14 mo Time Father spends with child	.31*		
14 mo Time Father spends playing, reading or talking to baby	.34**		
Child Temperament			
Distractibility (DOTS)			-.29*
Difficult temperament (CHQ)			-.30*
Child Social Development			
SSRS-Positive Social		.29*	.^{50***}
SSRS-Negative: Disrupts, Argues, Loner			-.^{33*}
Child Health Questionnaire -Negative Behavior		-.^{29*}	-.^{32*}
Vineland Social Development Domain		.^{44**}	.^{58***}
Child Health			
Mother's rating of child's general health (CHQ)		-.38**	-.^{31**}

^{1}(EHS families only) $^{***}p < .001$, $^{**}p < .01$, $^{*}p < .05$, $^{t}p < .1$

Summary and Discussion

The findings from this study demonstrated that participation in the Educational Alliance's Early Head Start was negatively affected by exposure to community and domestic violence. It seems likely that this would be the case in other EHS programs as well. Programs may need to make greater outreach efforts to overcome the barriers to participation created by exposure to violence.

Further research is needed to better understand the mechanisms by which exposure to violence suppresses participation. It may be that families do not want their situation to come to light because of feelings of shame, or because of fears of legal action that may result in their custodial rights being threatened. Further research into this question could guide better outreach efforts to these vulnerable families.

Similarly, traditional cultural values may also present barriers to participation. Families may fear that their values will not be respected, and that their authority with their children will be undermined. What approaches would be most effective in this situation is an open question. Is it best if differences are openly acknowledged in a climate of respect for different value systems? Can parents who are members of the traditionally oriented culture, and who have bonded with the EHS program play a role in building bridges to other families? Further research is needed to evaluate different approaches to effective outreach to families whose values are more traditional than those of the EHS program.

Father involvement supported participation. It was somewhat surprising that father support was such a robust predictor of participation; especially given how few of the wide range of potential predictors tested yielded significant effects. However, the importance of fathers has been consistently demonstrated in the EHS father research initiative. Further research is needed to explore the mechanisms through which father support promotes participation.

The pattern of findings generated from parent's experiences in their families of origin was very interesting. When parents experienced their fathers as harsh and rejecting, attendance was likely to be lower. Conversely, when parents experienced their fathers as loving and accepting, attendance was likely to be higher. Similar scales (PARQ) also tapped parents' feelings about the relationships they had with their mothers when they were growing up; but maternal acceptance and rejection was not associated with attendance. One possible explanation for this set of findings is that the group means for the maternal acceptance dimension was considerably higher than for fathers' acceptance and rejection, and the father harshness and rejection mean was distinctly greater than the maternal harshness and rejection mean. In other words, most parents reported fairly benign relationships with their mothers when they were growing up, but many parents experienced rejection and harshness from their fathers. Therefore the father relationship dimensions had greater variance and thus greater statistical power. In a much larger sample, the maternal dimensions might have also predicted EHS program participation, but they lacked the statistical power to generate significant correlations in this sample.

Maternal efficacy (when babies were six months old) was positively associated with involvement with EHS social service staff. (There was no effect for maternal efficacy on children's attendance.) Maternal efficacy is an indicator of how much confidence a parent has in confronting the challenges of raising a young child. Thus this finding suggests it was easier for more confident mothers to engage, or "open up" with EHS social service staff. Hopefully, EHS family workers are well aware that mothers who are less confident or secure in their mothering abilities are likely to hold back from involvement.

Families who apply for EHS and then do not participate in the program can easily be forgotten. EHS programs are fully occupied by serving the families that actively seek their services. Understandably, programs are unlikely to devote their energies to pursuing families who may appear uninterested or unmotivated. Findings in this study though suggest that families who withdraw may do so for very different reasons, with very different implications. Therefore it seems very important for programs to understand as deeply as possible the individual reasons behind withdrawal and low involvement. When families withdraw because there is not a good fit between the child-rearing values of the program and of the family, there is no cause for immediate alarm for the safety and well-being of the child or the family. However, programs may question whether they are sufficiently inviting and inclusive toward all segments of the communities they serve when this is the reason for family withdrawal.

When family withdrawal from an EHS program is related to the lack of father involvement, it is possible that the underlying issue is that the mother lacks the support and resources necessary to sustain involvement. At least in New York City, the tasks of bringing a child to the EHS center and picking up the child again can involve complex and time consuming travel arrangements. Greater family resources make attendance and involvement more likely. Recent research on father involvement makes clear that father involvement translates into greater family resources. (Ongoing EHS research on father involvement may reveal more sophisticated explanations of how fathers affect family childcare decisions.) Thus EHS programs might be alert to the lack of father involvement as an indicator that families new to EHS may need extra attention and support if they are to maintain attendance and involvement.

The most ominous reason (of those uncovered in this study) for a family to withdraw from EHS is exposure to violence. Children and families in these situations are clearly at high risk. Of course EHS programs cannot always know whether domestic violence or community violence is a dynamic in a family's withdrawal. But EHS staff could explicitly address the question to themselves as to whether any warning signs of violence were evident when families "disappeared." Further research is needed to explore the magnitude of this problem; and, if necessary, to increase EHS awareness of its dimensions.

Outcomes of Participation

The Educational Alliance's Early Head Start program demonstrated a wide range of benefits for child development, parenting, and parental psychological well-being. The literature on early intervention programs demonstrates that "Two-Generation" program models are necessary to provide benefits to both children and parents. The Educational Alliance's EHS program sought to provide direct services to both children and parents, and the data supports the view that the Educational Alliance EHS program was an effective Two-Generation Program.

Child development benefits were found in the realms of cognitive, social, and language development. Cognitive development benefits were manifested at each age milestone. Effect sizes were of moderate strength (average r = .32). The effect size for social development was also moderately strong (SSRS r = .42, .38). Similar effect sizes for communication gains were also found (Ratings of the Quality of Children's Communication, Vineland Communication Domain, average r = .32).

A range of parenting variables yielded significant correlations with program participation. Small but significant effect sizes were found for observational measures including the high-chair scales, and HOME, and local coded videos (Maternal Didactic Responsive Factor). Survey ratings of parental discipline and parenting also yielded significant correlations with participation. Confidence in these findings is increased by the multi-method nature of the data—both observational measures and survey measures supported the benefits of program participation on parenting and parent discipline strategies.

Program participation showed moderately strong effects on self-report measures of psychological well-being. Dimensions showing significant program effects included emotional distress, depression, parenting stress and social support. Effect sizes ranged from small to moderately strong.

Eliminating the families whose children did not attend the program raises the question of bias. Indeed, the first set of analyses reported in this paper demonstrated that low participation was not a random phenomenon. Families with higher levels of exposure to domestic violence and community violence were less likely to participate in the EHS program. Families with higher father involvement were more likely to participate in the EHS program. Neither exposure to violence or father involvement were significantly associated with children's cognitive development in this study, thus it is unlikely that the pattern of findings that emerged were substantially affected by lower levels of these variables in the EHS program families. Further, exposure to violence at baseline was a predictor of sample attrition for control group members, as well as a predictor of lower levels of program participation. This attrition probably balances out some of the effects of eliminating "poor attendees" from the EHS group. However, it is possible that some of the parent domain gains may have been enhanced by the exclusion of the "poor-attendance" group.

One purpose of this initial investigation was to identify factors to test as potential moderators of program effects. Exposure to violence, cultural child-rearing values (Modernity) and father involvement have emerged as candidates for inclusion in future analyses.

In summary, the data support the effectiveness of the Educational Alliance's Early Head Start program in promoting child and family development, for those who actually participated in the program. But it seems unlikely that this range of benefits could have emerged from an analysis that did not take the substantial rates of program nonparticipation into account. An analysis of those who actually participated in the program is crucial for answering the research question "What benefits can be reasonably expected from participating in Early Head Start?"

Correlates of Children's Cognitive Development

A wide range of factors was associated with children's cognitive development, including the quality of parenting and the quality of parent-child interaction, parents' emotional well-being and social support, children's social development, children's health, and the quality of families' involvement with the EHS program. Some, or all, of these dimensions may have been pathways to children's cognitive gains at the Educational Alliance's EHS program. Indeed, parenting, parent-child relationship, and parents' social support and psychological well-being were all positively affected by program participation. Of course, the direction of causality is ambiguous, and likely not uni-directional in these reported associations. But our purpose here was not to test mediators through path analyses, but to illustrate that children's cognitive development is embedded in multiple levels of systems, at the child, family, and program levels. The implication of these findings is that early intervention programs are likely to be increasingly effective, to the degree that they are able to address each level of the system in which children's cognitive development is embedded.

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A NOTEWORTHY PATTERN OF EARLY HEAD START PARTICIPATION: ENROLLMENT==>WITHDRAWAL==>RESUMPTION

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There is always value in listening to the direct testimonials of program clients, but this particular mother's story has an interesting twist. She withdrew from the Educational Alliance's Early Head Start (EHS) program, and sought other arrangements for her two-year-old daughter. (The Educational Alliance Early Head Start program provided center-based EHS services, and was open for children from 9 a.m. until 3 p.m.) Eventually, she chose to return to the EHS program. Thus this is not a narrative about a family that was completely satisfied with EHS from start to finish. Here is her story, in her own words, about leaving, and returning, to EHS.

Mother left the EHS program because of concerns about teacher turnover, and her need for full-day childcare:

> Well, now this teacher seemed like she was good, she worked two months, September, October, two, three months and now she's gone. But she was good. Oh, my daughter loved her. She was there such a short time. Well, I guess it took my daughter a while to get to know her but sometimes I was holding her and she wanted me to put her down so she could run to the teacher and the teacher was very affectionate. So I don't know what's going on, I don't know…and I was looking into other programs because I need to work full-time. I need to work 9 to 5. I have a lot of bills, a lot of responsibility. A part-time job would not be enough. So I was looking into other programs, I like programs. I don't like babysitters at home. I'm really against that. I don't like it. I feel comfortable when my child is in a center.

Mother's experience at new child care center:

> Yes it was a day care, it was full day…It was very terrible. I argued with the teacher. My daughter was just there for a week. She didn't eat. She cried every as soon as I left her until I picked her up… Yes, and I don't blame her because of the way they were. I'm leaving her there with strange people she's never seen before, and she starts crying. Their policy is to ignore the child—'They have to learn.' And, no, I don't think so, I don't agree. If a child is coming into a strange environment that child needs to feel comfortable, needs to feel loved. Maybe in the first week, that first week, that child needs attention, yes, needs special attention. They need to pick up the child, make them feel comfortable, take them towards the toys, try to play with them and then the child becomes comfortable. But no, they don't do that. … and so one of the teachers, she was from my country, she said, 'Oh remember back home, the way they were, you know, the teachers are allowed to hit the children.' And I'm like, 'Oh no no no!' I don't agree with that, but she said that's what they use in this program. Yes. They are allowed to hit the babies on the, they hit the children on the hand. They are allowed to do that. They said that that is allowed. I'm like, 'Oh no!' It was a horror. That school, the other center--no affection at all. Like they were in the military or something, like the lady said, remember back home? That's the way they are. They are very negative. I only tried it because it was an 8 to 6 program.

A series of unsuccessful attempts to find childcare ensued:

> So then I tried another private babysitter and, I mean, my daughter went through such a hard time…I had been to three different caregivers and centers and whatever… I just saw that that Educational Alliance was the best place in the world.

Mother returned to the Educational Alliance Early Head Start Program:

> It was such a relief seeing familiar faces, people that when my baby walks in they hug her, they, and I can't stress…I can't I can't stress it enough I am very grateful that my daughter is in it… Yes and my daughter loves everybody, well, practically everyone, in there. She runs to the toddler room. I feel fortunate I just feel really fortunate to have this program although, well, I really wish it was like, longer hours…I just feel very grateful for Educational Alliance.

Commentary

Clearly, the EHS program does not perfectly meet this family's needs. Full day coverage was a problem for the mother, and it remained a problem for her. The mother has understandable concerns about turnover—her EHS site had a new head teacher every year. But as was reflected in the ratings of classroom quality we obtained from the EHS program versus other childcare settings in the city; the Educational Alliance's EHS program was a much better place for children than most other options available to low-income Lower East Side families. And as was well documented by the recent National Institute of Child Health and Human Development (NICHD) study, low quality childcare is harmful to children. But in spite of the ongoing challenges posed by staff turnover, the EHS staff was reliable, warm and caring. The facilities were always bright, clean, well-furnished and safe. Children were happy to be there.

MOTHER-CHILD LANGUAGE AT 14 AND 24 MONTHS: CONCURRENT AND LAGGED ASSOCIATIONS

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The quality and quantity of caregivers' language is one of the most powerful predictors of children's early language and cognitive development. It is no wonder that a fundamental goal of many Early Head Start practitioners is to encourage parents to engage in frequent verbal discourse with their children, and to do so in ways that are sensitive to children's emergent language, for example by asking questions that elicit children's own verbal participation (e.g., "What is that?" "Where is the cup?"). Importantly, parenting often mediates the impact of early interventions (as also demonstrated in this EHS report), and parents' verbal input accounts for much of the variation linking poverty to compromised child outcomes (e.g., Hart & Risley, 1995). Given the importance of parents' language for children's language and cognition, researchers at New York and Harvard Universities have focused on the amount and diversity of language to which young children are exposed during the period of 14 to 24 months. In this study, transcript data from the two local sites were merged and associations between mothers' language and children's language and developmental status (i.e., Bayley MDI) were explored.

One hundred and forty-six mother-child dyads participating in the research at the New York and Vermont sites, from both treatment and control groups, comprised the sample. Forty-eight percent of participants identified themselves as White, 25 percent as African American, 17 percent as Latina, and 10 percent reflected a combination of other groups (West Indian; Asian; mixed ethnicity). All parents spoke English with their children.

The semi-structured 3-bag task from the national protocol was the basis of mother and child language at both 14 and 24 months. Each videotaped play session was transcribed, and CHILDES (Child Language Data Exchange System; MacWhinney and Snow, 1985) was used to calculate the total number of words (i.e., tokens) and different words (i.e., types) expressed by each mother and child at each age. In addition, the total number of "wh" questions that mothers directed to their children was calculated. Children's Bayley MDI performance and data from the MacArthur CDI were included in analyses.

Findings revealed that mothers and children varied dramatically in their number of word types and word tokens, although children, expectedly, were quite limited in their language at 14 months. At 14 months, the mean Bayley MDI for the sample was 95.8 (SD = 11.2). These scores dropped to a mean of 88.5 (SD = 13.7) by 24 months. On the MacArthur CDI, mothers reported that their 14-month olds comprehended a mean of 49.3 words (SD = 19.60) and produced a mean of 12.2 words (SD = 13.0). At 24 months, children produced a mean of 60.1 words (SD = 22.7) and averaged 9.3 (SD = 8.23) on sentence complexity.

At 14 months, all aspects of maternal language predicted most of the child measures (see Table 1). Specifically, maternal word types, tokens and "wh" questions were consistently associated with children's comprehension and production on the MacArthur, Bayley MDI scores, and the Bayley Language factor. Maternal word types correlated with children's types and tokens, albeit weakly. At 24 months, maternal language measures were associated with every measure in children with the exception of tokens (see Table 2). Although these associations are concurrent in nature, thereby barring causal interpretations, lagged correlations suggest that mothers' earlier language predicts children's language and developmental status over time (see Table 3).

TABLE 1
MOTHER-CHILD ASSOCIATIONS AT 14 MONTHS

	Child Types	Child Tokens	MacArthur Comprehension	MacArthur Production	Bayley MDI	Bayley Language Factor
Mother Types	.17*	.20**	.32***	.20**	.21**	.35***
Mother Tokens	.09	.14	.34***	.19*	.22**	.34***
"Wh" questions	.01	-.06	.25**	.21**	.21**	.31***

* p < .05 level; ** p < 0.01 level ; *** p < .001

TABLE 2
MOTHER-CHILD ASSOCIATIONS AT 24 MONTHS

	Child Types	Child Tokens	MacArthur Comprehension	MacArthur Production	Bayley MDI	Bayley Language Factor
Mother Types	.19*	.06	.36***	.32***	.31***	.26**
Mother Tokens	.22*	.14	.36***	.31***	.26**	.20*
"Wh" questions	.18*	.14	.33***	.25***	.32***	.24*

* p < .05 level, ** p < 0.01 level ; *** p < .001

TABLE 3
ASSOCIATIONS BETWEEN MATERNAL LANGUAGE AT 14-MONTH OBSERVATION AND CHILD LANGUAGE AT 24 MONTHS

	Types	Tokens	MacArthur Comprehension	MacArthur Production	Bayley MDI	Bayley Language Factor
Mother Types	.21**	.11	.30**	.30**	.30***	.30***
Mother Tokens	.20**	.09	.30**	.31***	.32***	.27**
"Wh" questions	.12	.06	.25**	.26**	.31***	.29**

* p < .05, ** p < 0.01; *** p < .001

To explore these lagged associations further, a set of simultaneous regressions were conducted in which the joint contributions of child and mother at 14 months were examined in relation to each child and mother outcome separately at 24 months (see Table 4). Because measures of language within mothers and within children covaried at both ages, particularly types and tokens (rs = .91 and .87 in mothers and .89 and .88 in children, at 14 and 24 months respectively), regressions included only one child and one mother language measure in predictive equations.

As can be seen in the top half of Table 4, for the most part, mothers and children both contributed unique variance to children's language and cognitive outcomes at 24 months. However, children's 14-month language did not predict mothers' later language over and above mothers' own stability (see Table 4). Mothers were highly stable in their language over time. Indeed, the strongest predictor of 24-month maternal language was mothers' earlier language. Children were also stable (in terms of the rank order of individual differences) in their developmental status and language, even in the context of enormous growth in their language competencies over the one-year period.

Together, these findings indicate that mothers' language at the onset of children's language acquisition (here 14 months), is beginning to make a substantial difference in children's emergent cognitive and linguistic abilities. This observation, coupled with the finding that mothers and children are stable in their language across the second year, suggests the importance of encouraging mothers to talk to and ask questions of their children from a very early stage. Parents should be encouraged to regard children as active communicative participants well before they begin speaking with regularity. The stability evidenced in children's language and cognitive performance already by 14 months, albeit in the context of their limited proficiency,

TABLE 4
REGRESSIONS EXAMINING JOINT CONTRIBUTIONS OF MOTHER AND CHILD AT 14 MONTHS TO MOTHERS' AND CHILDREN'S LANGUAGE AT 24 MONTHS

Dependent Measure	14-Month Predictors	Beta	t-value	Total R^2	F
Child 24-Month Language					
Types	Mom Types Child Types	.17 .26	2.17* 3.39***	.11	9.62***
Tokens	Mom Tokens Child Tokens	.06 .28	0.70 3.55***	.09	7.36***
MacArthur Production	Mom Types Child MacArthur Prod.	.23 .39	3.11** 5.24***	.24	23.08***
MacArthur Sentence Complexity	Mom Types Child MacArthur Prod.	.22 .36	2.72** 4.41***	.21	17.04***
Bayley MDI	Mom Types Child Bayley MDI	.23 .46	3.32*** 6.68***	.32	34.27***
Bayley Language Factor	Mom Types Child Bayley Lang. Factor	.12 .47	1.53 6.11***	.27	26.24***
Mother 24-Month Language					
Types	Mom Types	.63	10.16***	.41	55.60***
Tokens	Mom Tokens	.65	10.72***	.44	61.08***
"Wh" questions	Mom "wh" questions	.65	10.79***	.42	58.33***

suggests that mothers' language has already begun to affect children's emerging language in children's first year, underscoring the importance of this foundational period of learning.

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PARENTS' PERCEPTIONS OF TRAINING AND SERVICE ACTIVITIES REGARDING THEIR CHILD'S NURTURING AND DEVELOPMENT: IMPLEMENTATION AND BENEFITS OF EARLY HEAD START

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In today's socially conscious society, it is reasonable to assume that families who do not participate in a particular early childhood development intervention have recourse to alternative services. Even in rural locales such service options are increasingly available, but may vary in the quality of what is provided (Perroncel, 2000; Little Hoover Commission, 1998). Annual or quarterly monitoring of a program such as Early Head Start (EHS), may yield information regarding conformity to intended criteria or standards (c.f., U.S. Department of Health and Human Services, 1997), yet fall short in developing a picture of de facto service delivery, especially regarding whether that level of service would have been attained in the program's absence (Lincoln & Guba, 1984). Thus it may be as important to gauge the relative strength and quality of an intervention as perceived by the consumer as it is to assure staff-reported conformance to national standards or, as some would argue, to assess staff-determined impacts (Balaban & Dubiel, 1993).

At the onset of the Washington State Migrant Council's Early Head Start Program (WSMC-EHS), the family cornerstone was identified as being of paramount import in the Council's larger mission to enhance the contributions of their constituents to the communities in which they reside (WSMC Early Head Start, 1995). The impact of EHS in supporting and strengthening the

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integrity of the family unit was considered a crucial element and fundamental to increasing parents' ability to nurture their children's early development (U.S. Department of Health and Human Services, 1999). With regard to the predominantly Mexican and Mexican American families of the rural areas served by WSMC-EHS, and whom they describe mainly as Hispanic, the interplay of cultural variables, particularly language and acculturation, were seen as some of the more salient of the potential moderators of that impact (c.f., Cox & Malabonga, 1998; Balaban & Dubiel, 1993; Garcia-Coll, 1990).

Hypotheses underlying our research on child outcomes pertained to whether families in Early Head Start experienced services focusing on child nurturing and development that they would not have received otherwise, and whether they perceived themselves and their children to have benefited from those services. We speculated that EHS families would report substantively higher levels of opportunity, participation and benefits than would families in a comparison group. In reference to service receipt, we also hypothesized that levels reported would be attenuated by gender, home language use and selected acculturation variables.

Information on 189 families determined as eligible for WSMC-EHS, who had a child born between September, 1995 and August, 1998, and who agreed to participate in the research were forwarded to Mathematica Policy Research for random assignment and inclusion in the national sample. Ninety-five families were assigned to the EHS Program and 94 families to the comparison group. Over the course of the three-year period, attrition accounted for the loss of 39 families from the research, resulting in a retention rate of approximately 79 percent. Nearly all of the families were of Mexican or Mexican American descent (97 percent). Two families were of Native American descent, one family was from Pakistan and three were Anglos. Over half of the parents were in their teens or early twenties. There were 36 single parent families (34 mothers) and three families in which the grandparent was the primary caregiver. The predominant family occupation was agricultural, with many working family members engaged in seasonal fieldwork, or in fruit processing warehouses. Slightly fewer than 10 percent were typified by WSMC as interstate migrants. Names of 15 EHS families were placed on a service waiting list for an average of 5.7 months (range = 1.5 to 14.8 months).

A locally designed Supplemental Services Interview (SSI) protocol and the 12-item, two-dimensional version of the Short Acculturation Scale (SAS; Marín & Marín, 1991) were utilized for the purposes of this research. The SSI and SAS were administered concurrently with the Program Services Interview (PSI), employed in the national study of EHS (U.S. Department of Health and Human Services, 2001). Administration and training protocols mirrored those described for the national study in which two local research staff, both of Mexican American heritage, met criteria for certification to conduct the PSI. In addition, the SSI and SAS were subjected to pilot administrations in which the local research staff co-administered and co-critiqued trial interviews with 25 non-EHS research families.

During the study, the SSI and SAS were administered to families on three occasions: approximately 6 months, 15 months and 26 months following random assignment. Thirty-one SSI items sampled parent's perceptions regarding services received, their participation in activities relating to child nurturing and development, financial stability of the family and their involvement in the community. Eight SAS items sampled respondents' comfort in speaking with persons who spoke Spanish or English, while four items addressed respondents' daily affiliations. In addition, local research staff completed post interview, contact sheets pertaining to observed variables (e.g., language used during interview, responsiveness of participants, father's participation).

Respondents were asked whether they had one or more opportunities to participate in home support, formal child development or child care training, adult education activities or events in the previous month. Table 1 is a descriptive summary of the frequencies of parents reporting opportunities over three rounds of interviews. At six months after random assignment, over two-thirds of EHS families reported one or more opportunities for parent meetings, as compared to one-fifth of the comparison group families. The differences in opportunities were statistically significant and sustained over the 15 and 26 month interview rounds, although, the numbers declined slightly for EHS families as they exited the program.

TABLE 1
PARENTS' OPPORTUNITIES FOR PARTICIPATION IN CHILD DEVELOPMENT AND CHILD-CARE ACTIVITIES

Item	Group	6-Month	15-Month	26-Month	Overall
		Percent of Respondents			
S5.1: Asked to Attend Parent Program Meetings	EHS	57*	59*	58*	68*
	Comparison	19	16	24	25

* p<.01

Table 2 represents a more focused examination, drawn from the 26-month interview round, and depicts mean frequencies of participatory opportunities, mother's, relative to father's attendance, and among English or Spanish-speaking subgroups. All EHS families averaged more than 12 opportunities for every 1 reported by all comparison group families. EHS Mother's attended nearly 65 percent of the activities they were invited to. The ratio of EHS to comparison group mother's attendance exceeded 8 to 1 and the difference was statistically significant. According to mother's accounts, EHS fathers attended barely over 5 percent of the activities, and the overall difference between EHS and comparison group fathers was not statistically significant. These trends were consistent across English and Spanish-speaking sub groups of families. However, EHS Spanish-speaking families (63 percent of families) reported slightly higher averages of opportunities and attendance than did EHS English-speaking families

(37 percent of families). Although quite low, the levels of attendance differed among English-speaking fathers, approaching statistical significance in favor of EHS fathers.

TABLE 2
OVERALL INVOLVEMENT IN CHILD REARING AND EDUCATION-RELATED ACTIVITIES AND EVENTS (QUESTIONS 5.2)

Item	Group	Mean Frequency	t Value	Significance Level
All Activities, All Families:				
Opportunity	EHS	13.03	5.67	.000*
	Comparison	1.12		
Mother's Attendance	EHS	8.41	5.14	.000*
	Comparison	1.07		
Father's Attendance	EHS	0.71	0.31	.76
	Comparison	0.60		
All Activities, English Speaking:				
Opportunity	EHS	9.25	3.35	.002*
	Comparison	0.17		
Mother's Attendance	EHS	6.36	2.96	.005*
	Comparison	0.11		
Father's Attendance	EHS	0.39	1.80	081***
	Comparison	0.00		
All Activities, Spanish Speaking:				
Opportunity	EHS	16.26	5.06	.000*
	Comparison	1.47		
Mother's Attendance	EHS	10.17	4.55	.000*
	Comparison	1.43		
Father's Attendance	EHS	0.86	0.10	.92
	Comparison	0.82		

*p<.01
**p<.05
***p<.10

Break-outs on types of opportunities for training and support at 26 months (not displayed) revealed significant differences in favor of EHS families for four of five categories: Parent Literacy Education (t = 3.27, p <.01), Education in Child Rearing (t = 7.07, p <.000), Center or

Program Visits (t = 1.98, p <.05) and Individual or Family Consultations (t=2.40, p <.018). No differences were evident for the category "Other."

While reported attendance was somewhat less frequent, EHS parents attended significantly more of several categories of events than did their comparison group counterparts across all categories combined. Education in Child Rearing was the predominant category of attendance, with EHS mothers, averaging nearly 7 over a 12 month period, and comparison group mothers reporting no opportunity in this category (t = 5.60, p<.000). There was negligible reported attendance (averaging from 0 to .39 incidences per reporting period) in any category by fathers of either group, except that more EHS fathers attended education in child rearing (t = 2.01, p<.047).

Because WSMC-EHS was predominantly a home-based program, the provision of home services and support pertaining to child nurturing and development was of particular interest. Results of interview questions pertaining to the frequency of home visits across the three interview rounds are summarized in Table 3. Overall, more than 90 percent of EHS families, and 5 percent of comparison group families reported one or more home visits were made during the month preceding an SSI interview. At six months, 63 EHS families (76 percent of respondents) and four comparison group families (5 percent of respondents) reported one or more home visits occurred in the last month. The number declined for EHS families at 15 and 26-month interview rounds as families were exited from the program. However, the difference remained statistically significant in favor of EHS families.

Table 4 depicts an analysis of home visit groupings, drawn from the 26-month interview. Families were asked to identify the persons making visits over the previous 12 months. Overall,

TABLE 3
PARENTS REPORTING ONE OR MORE HOME VISITS IN PREVIOUS MONTH

		Percent of Respondents			
Item	Group	6-Month	15-Month	26-Month	Overall
S5.3: Home visitor provided assistance or training in child care, nurturing and development	EHS Comparison	76* 5	75* 1	55* 4	91* 3

* p<.000

TABLE 4
TYPES AND FREQUENCIES OF VISITS REPORTED BY FAMILIES OVER THE 12 MONTHS PRECEDING THE 26-MONTH INTERVIEW

Titles Derived from Described Purposes of Visits	Group	Mean Frequency	t Value	Significance
Case Manager	EHS	0.66	1.59	.115
	Comparison	0.00		
Home Educator	EHS	13.44	7.22	.000*
	Comparison	0.00		
Social Worker	EHS	0.00	--	--
	Comparison	0.00		
Health Worker	EHS	0.31	1.11	.269
	Comparison	0.05		
Teacher	EHS	0.00	--	--
	Comparison	0.00		
Child Care Center Staff	EHS	0.00	--	--
	Comparison	0.00		
Other	EHS	0.24	-1.32	.190
	Comparison	2.10		
Overall	EHS	14.47		.000*
	Comparison	2.15	5.17	

*p<.000

for every home visit reported by comparison group families, EHS families reported nearly seven home visits, and 93 percent of them were for the purpose of home education in child-care and child rearing. This difference was statistically significant in favor of EHS families, while there was no difference in the remaining categories (case manager, social worker, health worker, teacher, child care center staff, other). During informal follow-up interviews with EHS staff, case managers indicated that most of their work for families was carried out at intake and then indirectly thereafter, through telephone calls or meetings with health, mental health, social service and housing agencies. Further, EHS staff indicated that the health worker's time was focused mainly on group parent training at the center, and that her home visits were with a small number of families who had significant health/nutrition issues. Home educators, one assigned to each of six communities, carried out the bulk of the visitation schedule.

The EHS and comparison group differences in home visits at 26 months were similar for subgroups of English and Spanish-speaking families (not depicted). However, the average frequency of home visits for EHS Spanish-speaking families (18.24) was more than twice that for EHS English-speaking families (7.83). During informal interviews with EHS staff, they suggested that a number of monolingual Spanish-speaking families, many, recent immigrants from Mexico, had less favorable financial and/or family conditions, and thus had greater need for home support and training.

Parents were also asked to supply confidence ratings on their ability to care for their child, and nurture their child's development (1= strongly agree, 5= strongly disagree). While the differences only approached statistical significance, more EHS parents tended to rate themselves highly (strongly agree: 47 on child care; 43 on child nurturing) than did parents in the comparison group (strongly agree: 34 on child care; 34 on child nurturing).

No statistically significant differences or changes in family's SAS ratings were evident for the eight language preference questions, nor for three of the affiliation questions at any of the three interview rounds. However, at 26 months, EHS families demonstrated a significantly greater preference for their child to affiliate with English-speaking children (mean EHS rating: 2.99, mean comparison group rating: 2.77; $p < .04$). In contrast, between the 6 and 26 month interviews, comparison group families showed a shift in preferences for their child's friends, away from English-speaking children and toward Spanish-speaking children ($t = -2.17$, $p< .04$). While few differences across time or between groups were evident from the SAS, reviews of the interviewer's contact sheets revealed that more families described themselves as bi-lingual and responded to the interviews in English at 26 months than at the 6-month interviews (EHS group, 23 more, Comparison group, 18 more).

Twenty-six items of the SSI sampled respondents' perceptions of functional indicators of the family's involvement and acculturation to the community, as well as financial stability. At six months, significantly more EHS families reported they attended parent meetings at day care centers, preschools or early intervention programs, attended parent-teacher association meetings, and participated in clubs, community center, or community activities during the prior year than did comparison group families (Table 5). The difference in parent meeting and community center involvement was sustained through the 15 and 26-month interviews, but not for contacts with children's caregivers or teachers, nor for parent's attendance at PTA meetings.

There were no differences reported between EHS and comparison group families for items pertaining to economic or financial stability (e.g., rent/own a home, received welfare benefits, increased in annual income). However, between the first and last interview rounds a higher

TABLE 5
FAMILY REPORTS OF COMMUNITY INVOLVEMENT AND FINANCIAL STABILITY

Interview Item	Group	Percent of Respondents 6-Month	15-Month	26-Month
S8.1a. Talked with my child's caregiver in the past month.	EHS	40*	27	33
	Comparison	31	35	38
S8.1b. Talked with my child's teacher in the past month.	EHS	21*	5	8
	Comparison	4	5	6
S8.1c Attended parent meetings at my child's day care center or early intervention program in the past month.	EHS	35*	23*	36*
	Comparison	9	8	10
S8.1e. Attended PTA meeting in the past month.	EHS	30*	38	33
	Comparison	17	30	33
S8.1h. Attended a club, community center or community activity program in the past year.	EHS	13**	53*	27*
	Comparison	5	14	14

*p<.05
**p<.10

percentage of EHS families reported a) a raise in pay (11 percent at 6 months, 24 percent at 26 months), b) moving off from welfare benefits (18 percent at 6 months, 30 percent at 26 months), c) paying car license taxes (28 percent at 6 months, 44 percent at 26 months), and d) opening checking accounts (15 percent at 6 months, 26 percent at 26 months). Other indications of acculturation were drawn from reviews of interviewer's contact sheets between 6 and 26 months. EHS family contacts were noted more often as a) receptive to visits by non-relatives, b) outgoing and c) speaking often with their child (10 at 6 months, 78 at 26 months).

In summary, distances, limited tax bases and sparse population distributions continue to present challenges for providing child-care and child development, social, and health services in rural areas. Yet, an array of services are available in the Lower Yakima Valley, including state-funded child development and child care, the Farmworker's Clinic, Valley Memorial Hospital's child care and early intervention programs, privately supported child care programs, La Clinica mental health services and a county cooperative of agencies. While available, they may not be readily accessed by low-income families who are dependent upon seasonal agricultural work, who experience language or cultural barriers, and/or who have limited educational backgrounds. These access variables appeared to be highly salient in the evaluation of WSMC-EHS.

Though available, few comparison group families reported opportunities for, or their involvement in education, training or support pertaining to child-development and child nurturing. Most gained no access to center or home-based services on their own initiative. On the other hand, most EHS families reported frequent opportunities for, and participation in activities pertaining to their child's care and development, in some cases attaining an eight-fold advantage. This was despite several being placed on a waiting list for EHS services. The bulk of the activities they did report were carried out or arranged by EHS staff, and most often occurred in the home. Active participation from fathers in either group was reported as being low or nonexistent. This is consistent with reports of many programs serving high numbers of low-income, Hispanic, and in many instances, non-Hispanic, rural families.

Monolingual Spanish-speaking families received the most attention from EHS program staff, who indicated these families had the greatest need, and their comparison group counterparts reported the lowest service involvement. Nearly all of these families reported that service agencies provided Spanish-speaking staff. We offer that language may be less a barrier and more an indicator of families in the early stages of acculturation (c.f., Marín & Marín, 1991). Thus, EHS seems to provide an important buffer, supporting a period of adjustment to and by the community.

Considerable benefit from EHS participation was indicated, but the differences in benefit between EHS and comparison group families were slight. There was a trend toward greater confidence in child-care and child development abilities among EHS families. While a standard index of acculturation showed little change and few group differences, indicators of functional acculturation -- family and community participation -- suggested EHS families had enhanced involvement in selected areas.

From a quantitative standpoint, EHS families reported as high as a nine-fold advantage in access to, and receipt of training, services and support pertaining to child-care and child nurturing (see Table 2: Spanish-speaking families). We consider family access and participation to be important contextual requisites for the provision of best practices known to impact young children's development. The content and character of training, services and support pertaining to child care and child nurturing are often the focus of studies of child development programs. While they may address crucial aspects of the implementation of best practice, the "how" of service delivery is of little import if it is too limited in concentration, or shear amount of service provided (c.f., Hart & Risley, 1995). Although a significant part of the WSMC-EHS program's effort must be devoted to tracking its compliance with Head Start standards, the families served have also mirrored a level of involvement and benefit they were not likely to have attained otherwise.

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RELATIONS BETWEEN SPECIFIC AND GLOBAL FEATURES OF MOTHER-CHILD INTERACTIONS AND LANGUAGE

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The quality of parent-child interactions is one of the most powerful predictors of children's emerging cognitive competencies, especially that of language. It is no wonder that researchers, practitioners, educators and parents alike have ubiquitously been concerned about the features of parenting that are most relevant to positive outcomes for children, as well as the best ways to capture and evaluate those features in research and practice settings. Indeed, numerous approaches to the coding of parent-child interactions are available, and decisions about which to use are guided by both theoretical orientation as well as practical constraints.

In the Early Head Start Consortium, although local and National research teams shared a conceptual interest in measures of parental stimulation, cognitive support, and sensitivity, they adopted different coding strategies to assess such parenting constructs. For example, National measures of caregiver-child interactions of parent-child free play (referred to as the "three-bag-task" given the placement of toys in three bags) are based on global ratings of six dimensions of behavior in mothers (i.e., sensitivity, intrusiveness, stimulation, positive regard, negative regard, detachment) and three in children (i.e., engagement, attention, negativity). For such ratings, coders assigned mothers (and children) a score of 1 to 5 on each construct after one or two "passes" or viewings of the interaction. Such global ratings are frequently relied upon in large-scale studies due to the time-efficiency of coding as compared to other labor-intensive approaches (such as the transcription of parent-child interactions, which can take up to 10 hours per 10 minutes of interaction). In contrast, researchers at many local sites, including Harvard and New York University, placed resources into describing and capturing specific aspects of parent-child engagements, by transcribing the full array of verbal and gestural exchanges between mothers and children during the 3-bag task. Such an approach is more frequently characteristic of small-scale, single-site investigations. Both "macro" and "micro" approaches to assessing parenting have merits, and both are fraught with limitations. Yet little is known about whether and how data obtained from the two relate to one another. Unfortunately, methodological integration, although empirically valuable, is rare.

Here, we explore associations between transcriptions of mothers' and children's language (at a local level) and global ratings of mother-child interactions (at the National level) as a first step toward understanding the interface between general and specific features of (and approaches to) dyadic engagements. We expected aspects of mothers' language to relate to global measures of maternal sensitivity and stimulation, as mothers use language as a primary mode of engagement with children. Mothers who verbally respond to their children's initiatives, provide language-rich environments, and ask questions of their children are likely to be those who are viewed as more sensitive and cognitively stimulating at a National level. Reciprocally, children begin to use language around the second year as a principal means of communication and as a way to maintain involvement in interactions with their caregivers. Thus, coders are likely to consider children's verbal expressions as an index of their engagement, especially at this time.

Methods

To this end, research teams at Harvard Graduate School of Education and at New York University Graduate School of Education longitudinally examined mother-child discourse in a total of 146 dyads (balanced for child gender) during the three-bag task at 14 and 24 months. Mothers from the two sites ranged in age from 14 to 43 years at the time of their children's birth. The sample was ethnically diverse: 47 percent identified themselves as White, 25 percent as

African American, 17 percent as Latina, and 11 percent as other (e.g., West Indian, mixed ethnicity).

Maternal language samples were obtained through transcription of the three-bag, semi-structured play task used in the national protocol. With the assistance of Child language Data Exchange System (CHILDES) (MacWhinney & Snow, 1985), a computer program that uses electronic files of verbal transcripts to analyze various aspects of maternal and/or child speech, a count was obtained of the number of different words used by each mother and each child (i.e., word types); the total number of words used by mother and child (i.e., tokens), and the number of "wh" questions (e.g., "What is that?," "Where is the blue block?") used by each mother during the 14- and 24-month sessions. Global ratings of mother-child interactions were those coded at the National level from the three-bag task.

Results

As expected, mothers varied considerably in the amount of language (tokens) and diversity of language (types) they expressed toward their children at both ages. Similarly, children varied in word types and tokens at both ages, with variation increasing substantially by 24 months in line with children's emergent productive language (see Table 1). Global measures of mothers' and children's behaviors varied at both ages as well.

Maternal language was strongly related to global ratings from the three-bag task at 14 and 24 months (see Table 2). Mothers' total words, word types, and "wh" questions were positively associated with ratings of sensitivity, stimulation, and positive regard, and negatively associated with detachment (r range from .19 to .66, p < .05 to .0001). Mothers' use of "wh" questions was negatively associated with negative regard and intrusiveness, although associations were small (r range from .19 to .21, p < .05). In general, findings were consistently robust across the three major ethnic groups. As an example, correlations between mothers' language types and global

TABLE 1
DESCRIPTIVE STATISTICS FOR MATERNAL AND CHILD LANGUAGE

14-MONTH ASSESSMENT				24-MONTH ASSESSMENT		
	M	**SD**	**RANGE**	**M**	**SD**	**RANGE**
MOTHER						
Word Tokens	508.2	266.0	30-1244	631.2	249.2	55-1294
Word Types	124.7	46.2	14 –221	160.0	49.1	29-320
Wh- Questions	10.4	9.63	0 – 22	12.3	11.5	0-83
CHILD						
Word Tokens	6.58	10.46	0-63	95.8	72.3	0-333
Word Types	3.02	4.14	0-22	39.2	24.0	0-99

TABLE 2
ASSOCIATIONS BETWEEN MOTHER AND CHILD LANGUAGE AND GLOBAL RATINGS AT 14 AND 24 MONTHS (N=146)

	Mother Language 14 Months			**Mother Language 24 Months**		
	Types	Tokens	"Wh" Questions	Types	Tokens	"Wh" Questions
Mothers' Global Ratings						
Sensitivity	.36***	.30***	.43***	.48***	.46***	.45***
Intrusiveness	.05	.10	-.15	-.06	.02	-.21*
Stimulation	.66***	.61***	.33***	.57***	.55***	.34***
Positive Regard	.54***	.56***	.46***	.47***	.44***	.42***
Negative Regard	-.06	-.05	-.20*	.08	.11	-.19*
Detachment	-.41***	-.42***	-.19*	-.48***	-.48***	-.24**

	Children's Language 14 Months		**Children's Language 24 Months**	
	Types	Tokens	Types	Tokens
Children's Global Ratings				
Engagement	.20*	.19*	.51***	.42***
Attention	.17*	.16	.48***	.33***
Negativity	-.04	-.01	-.12	-.01

* p < .05, ** p < .01, *** p < .0001

ratings of stimulation in African-American, White, and Latina mothers were .67, .64, and .70 at 14 months, and .66, .45, and .76 at 24 months (all p < .001).

The robust associations identified between aspects of mothers' language and the global measures of sensitivity, stimulation, and positive regard accords with the finding that these three measures covaried strongly at the National level, leading to the creation of a composite index of "supportiveness" (a composite score created by summing individuals' ratings on the three items). Consequently, we tested the joint contributions of mothers' language types, tokens and "wh" questions to the composite score of "supportiveness." At both ages, maternal language types and "wh" questions (but not tokens) contributed unique variance to the composite measure of supportiveness, together accounting for 40 percent and 42 percent of the variance in "supportiveness," at 14 and 24 months respectively.

In contrast to the consistently strong associations between mothers' language and global ratings, the magnitude of associations between children's language and ratings of their engagement, attention, and negativity varied with age. At 14 months, children's word types and tokens were weakly associated with global measures of child engagement and attention (significant r range from .17 to .20, p < .05); by 24 months, however, associations among these same measures were moderate to strong (r range from .33 to .51, p < .001).

Discussion

One of the fundamental benefits of the National-Local partnership structure of the EHS consortium is the ability of investigators to integrate site-specific and National data, thereby shedding light onto the nature, meaning and ecological validity of both local and National findings. An area of inquiry in which this synergistic partnership is exemplified is in the merging of local and National measures of parenting, as illustrated in this investigation.

In general, results support the validity of National measures of parent-child interactions by demonstrating their strong associations to independently coded, in-depth measures of mother and child language at two local sites. It appears that the team of national coders were especially aware of the verbal exchanges between mothers and children when evaluating mothers' sensitivity, stimulation, positive regard, and detachment and children's engagement and attention. The fact that mothers' language strongly related to global ratings of their interactions at both ages, whereas associations for children changed over age dovetails with developments in children's language across the one-year period. At 14 months, children are at the dawn of productive language, and their verbal expression of "words" is limited. Consequently, coders likely rely on non-verbal aspects of children's behaviors in their assessment of children's engagement and attention. By 24 months, however, children's verbal expressions become aptly central to coders' evaluations of children's engagement and attention, in line with the remarkable gains in language that occur at this age. These sensitivities in coders, and the fact that more cost-effective global ratings dovetail with findings at a micro-level, lends further support to the validity of the National findings on parenting. Importantly, these findings also bear on the training of program staff, who should be sensitized to the importance of mothers' and children's language interactions as key expressions and indicators of mutual sensitivity and cognitively rewarding dyadic interactions.

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CHANGE IN PARENT-CHILD INTERACTION IN LOW-INCOME FAMILIES: LINKS TO FATHER STATUS

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Contingent responsiveness is considered a foundation of child socioemotional and cognitive adjustment (Bornstein, Tamis-LeMonda & Haynes, 1999; Watson, 1985). Whereas studies of parent-child contingency have focused on mothers, the contributions of fathers to children's development are of equal interest. Moreover, because fathers' access to the child is often regulated to some degree by mothers (Hochshild & Machung, 1989), fathers' interaction styles should be considered in conjunction with mothers' interaction styles. Among low-income families, for whom economic instability and chaotic social circumstances contribute to high rates of single motherhood, inconsistent father involvement, and transitory male figures in children's lives (Halpern, 1993), patterns and processes of the mutual development of mothers' and fathers' interactions with their children warrant particular attention. This study examines changes in low-income parent-child dyads' contingent responsiveness over a 2 ½ year period while taking into account the dependence of individuals within couples.

In addition, fathers who reside with the child or non-residential fathers who are actively involved might be expected to demonstrate better parenting interactions with the child because they would have more familiarity with and motivation to respond to the child. Thus, two father status variables, whether the father resided in the home and whether he was the biological parent of the child, were examined as predictors of individual differences in parent-child interactions.

Sample. The sample for this study consists of 71 families, which included mothers, children, and men identified by the mother as the child's father or father figure. These families are participating in an ongoing longitudinal study of children eligible for Early Head Start in

Jackson, Michigan. Thirty-five of the families were not part of the EHS intervention, and 36 families were EHS participants. Mothers averaged 22.2 years of age (SD = 4.8) and mean income was $10,120 (SD = $6,316). The majority (81 percent) of the sample is Caucasian, 8 percent reported being African American, 5 percent report being of Mexican decent, and the remaining 7 percent of the sample reports being of other ethnicities. Forty-seven percent of the sample reported not having completed a high school diploma at enrollment, 35 percent report having completed high school or a GED, and the remaining 28 percent report having attended some college (with one person having completed at least a two-year program).

Procedure and measures. At enrollment (child age M = 4.8 months, SD = 3.61), 24, and 36 months, each parent individually participated in a teaching task with the child. Live observations were rated by researchers (trained to a minimum reliability of 90 percent agreement) using the Nursing Child Assessment Teaching Scale (NCAST; Sumner & Spietz, 1994). Contingent parent-child interaction was assessed using three parental contingency scales (Sensitivity to Cues, Social-Emotional Growth Fostering, and Cognitive Growth Fostering) and two child scales (Clarity of Cues and Contingent Responsiveness to Caregiver). Paternal residency (0 = non-resident, 1 = resident) and biological father status (0 = social father, 1 = biological father) were determined by mother report. Men who lived in the home during at least one assessment were classified as residents.

Results. Hierarchical linear modeling (HLM; Bryk & Raudenbush, 1992) was used to derive an overall trajectory, consisting of a mean level on the interaction scale at 36 months and an estimate of linear change in interaction over time, for each parent and child while accounting for interdependencies between parents. The paternal status variables were then used to predict individual differences in the estimates for mean level and change. Level means, change parameters (significant estimates represent significant change), and tests for differences between mothers' and fathers' estimates for the overall trajectories are presented in Table 1.

Mean level. At enrollment, mothers were more sensitive to infant cues, but less likely to foster social-emotional or cognitive growth than were fathers. By 36 months, the pattern had reversed: fathers tended to be more sensitive to cues than mothers, but were less likely to foster social-emotional or cognitive growth. Children gave clearer cues to fathers at enrollment, but showed no differences in behavior toward parents by 36 months.

Linear change. Both parents increased significantly over time in their sensitivity to the child's cues and cognitive growth fostering, but whereas mothers increased in social-growth fostering, fathers showed substantial decreases. Mothers increased more than fathers in sensitivity to cues and cognitive growth fostering. Children increased significantly in the clarity of cues and responsiveness toward both parents, but more so toward mothers.

Father status. Paternal residency, status as biological or social father, and the interaction between the two father status variables were examined to determine whether these characteristics accounted for variability in parent-child interaction trajectories. The results for the effects at enrollment are presented in Table 2.

Father status was not associated with maternal sensitivity to cues, but was consistently related to father sensitivity to cues. At enrollment, residential fathers were less sensitive than nonresidential fathers, and biological fathers were less sensitive than non-biological fathers. However, by 36 months, both residential and biological fathers had increased in sensitivity to cues; in fact, residential fathers were more sensitive than nonresidential fathers at 36 months (effect size $r = .26$, $p < .05$). Similar findings were evident among residential fathers (but not biological fathers) for cognitive growth fostering. At enrollment, residential fathers tended to be lower in cognitive growth fostering, but increased significantly over time.

TABLE 1

TRAJECTORIES AND DIFFERENCES FOR PARENT-CHILD CONTINGENT RESPONSIVENESS

	Parent interactions						Child interactions			
	Sensitivity to cues		Social-emotional growth fostering		Cognitive growth fostering		Clarity of cues		Responsiveness to caregiver	
Parameters	Enroll	36 mo.	Enroll	36 mo.	Enroll	36 mo.	Enroll	36 mo.	Enroll	36 mo.
Mother level^a	3.75	4.51	1.82	2.20	2.82	4.79	7.18	8.67	6.30	8.09
Father level^a	2.78	4.77	3.19	1.94	4.50	4.63	8.02	8.71	6.99	8.15
Level differences	**26.44*****	3.59^t	**50.40*****	**4.86***	**5.29***	.51	**7.79****	.04	2.39	.04
Mother linear change^b	**.33****		**.27***		**.68*****		**.59*****		**.50*****	
Father linear change^b	**.24***		**-.58*****		**.46*****		**.27***		**.29***	
Linear change diff.	**21.88*****		**43.07*****		**4.14***		**4.19***		.94	

[a] Mean. [b] Effect size r. [t] $p < .07$. *$p < .05$. **$p < .01$. ***$p < .001$.

TABLE 2

EFFECT SIZES FOR FATHER STATUS PREDICTING PARENT-CHILD INTERACTION TRAJECTORIES

								Child interactions				
	Sensitivity to cues		Social-emotional growth fostering			Cognitive growth fostering		Clarity of cues		Responsiveness to caregiver		
Parameters	Res.	Bio.	Res.	Bio.	Res. x Bio.	Res.	Bio.	Res.	Bio.	Res.	Bio.	Res. x Bio.
Mother level	-.06	-.09	.06	**-.24***		-.16	-.18	**-.28***	-.23^t	**-.35****	**-.39****	**.29***
Mother change	.06	.06	.18	**.40*****	**-.28***	.14	.10	.23^t	.22^t	**.26***	**.29***	**-.26***
Father level	**-.63*****	**-.25***	.08	.16		-.22^t	.06	-.08	.02	-.01	-.16	
Father linear change	**.60*****	**.27***	-.12	-.18		**.23***	-.13	.07	-.06	.08	.16	

Note. Effect sizes cannot be negative; directional signs are included to facilitate interpretation, where negative effect sizes in LEVEL represent lower levels at enrollment than at 36 months, and in LINEAR CHANGE represent decreases over time. ^{a} Mean. ^{b} Effect size r. ^{t} $p < .07$. *$p < .05$. **$p < .01$. ***$p < .001$. $\chi^2(1,70)$

Mothers' social-emotional growth fostering, but not the other two interaction variables, was the only contingency measure predicted by father status; fathers' own social-emotional growth fostering was not associated with their status as residential or biological. When mothers identified a social father figure rather than a biological father to be the child's father at enrollment, they showed higher levels of social-emotional growth fostering. There was also a residential x biological status interaction for change. This indicated that when there was a biological or social father in residence, mothers increased in social-emotional growth fostering, when there was a biological father living outside of the home, mothers did not change in social-emotional growth fostering, and when there was a social father living out of the home, mothers decreased in social-emotional growth fostering.

Father status was associated with child contingent responsiveness to mothers, but not fathers. At enrollment, children provided clearer cues to mothers when fathers were not in residence; there was no significant change over time. An interaction effect between residential and biological status indicated that when the father was a nonresidential social father, children were more contingently responsive to mothers at enrollment, but decreased in contingent responsiveness to mothers overtime.

The overall picture suggests that fathers and mothers were more similar in their contingent responsiveness toward the child by 36 months than they had been when the child was a young infant. Children's contingent responsiveness, which had tended toward favoring fathers, also became similar in interactions toward both parents. However, father status worked in distinct and complicated ways for mothers and fathers that were specific to different types of responsiveness.

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EARLY HEAD START SUPPORTS FAMILIES IN OBTAINING SERVICES FOR YOUNG CHILDREN WITH DISABILITIES

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A central purpose of Early Head Start (EHS) is child development, which includes the development of children with disabilities and delays since at least 10 percent of the infants and toddlers served by EHS must have documented eligibility for early intervention services. It follows that programs must comply with two related EHS principles: (a) inclusion of young children with special needs in EHS programs and (b) collaboration with early intervention service providers and systems to ensure that children of EHS families obtain early intervention services when warranted and that families of children being served by early intervention are referred and enrolled in EHS services when they meet EHS eligibility criteria.

While worthy ideals, the principles of inclusion and collaboration may be difficult to implement (Corso, 2000; Summers et al., 2001). For example, research has suggested that, although young children from low-income families face a higher risk of delays and disabilities (Brooks-Gunn, Duncan & Maritato, 1997; Sherman, 1998), their families are less likely to obtain early intervention services than more affluent families (Spiker, 2001). This may be due to a variety of factors, including the complex stresses of meeting urgent basic needs, such as adequate housing, nutrition, and health care that pose barriers to acting on behalf of an individual child. Additionally, parents may have great difficulties negotiating unfamiliar and complicated service systems. EHS staff must address these underlying barriers, if they are to improve child outcomes by supporting low-income families to obtain the early intervention services that might prevent or mitigate the negative effects of delays or disabilities.

A team of researchers from the Catholic University of America (CUA), comprised of professionals in psychology, education, and social work, conducted two studies to: (a) determine whether EHS enhances the likelihood that low-income families will obtain early intervention services and (b) identify how EHS works with families toward that goal. The first study investigated whether EHS facilitates referral, identification, and access to early intervention services for infants and toddlers through case studies of 32 families living in an impoverished corridor of a generally affluent, densely and diversely populated Mid-Atlantic suburban area served by the United Cerebral Palsy Early Head Start Program. We conducted case studies of 19 EHS (intervention) and 13 comparison families with focus children suspected of needing early intervention services for developmental delays or disabilities (through PL 105-17, the Individuals with Disabilities Education Act Amendments of 1997, either Part C or Part B). We defined suspected need as a recommendation that a parent contact early intervention services from either medical or community providers (4 EHS families, 4 Comparison families), EHS staff (14 EHS, 0 Comparison), researchers (through notification of low Bayley scores; 1 EHS, 8 Comparison), or self-referral (0 EHS, 1 Comparison). We drew these 32 cases from the combined 149 EHS and comparison families; they represent all cases in which there was suspected need by the time the focus child was 3 years old. (The sole exception is one family whom we could not reach for interviews.) The ethnic/racial profile of the 19 EHS families includes eight that were Hispanic immigrant, five African American, and six Caucasian families. Among the 13 Comparison families were four Hispanic immigrant families, one other immigrant, six African American, one Caucasian, and one Hispanic American.

Our case studies integrated in-depth interviews of mothers and staff with reviews of program and research records from the national EHS evaluation and CUA's local research. The first four authors conducted the record reviews and all interviews, except when parents spoke only Spanish fluently. A bilingual social worker conducted these six interviews accompanied by a researcher. We interviewed EHS staff (home visitors and case managers) prior to parent interviews to learn about their work with these families in general and with the child with suspected special needs in particular. Parent interviews were open-ended to follow the lead of the informant who was telling her story but incorporated questions to cover research concerns, such as parent perception of the child, reaction to notification of suspected special needs and actions taken to help the child, including their experiences working with EHS and early intervention services.

Parent interviews, lasting about 90 minutes, were audio taped and later transcribed. From our review of transcripts and records, we developed a matrix indicating the dates and outcomes of the relevant steps associated with the process for securing early intervention services. From a review and tally of the data, we developed Table 1 comparing outcomes for EHS and Comparison families on these steps toward early intervention services.

Results indicate that a larger number of EHS families were notified of a suspected need to refer, probably due to the involvement of another set of "educated eyes" (those of EHS staff) with their children (see Table 1). With the active encouragement of EHS staff, 18 of 19 (94 percent) EHS families followed through to make the referral to the Part C or Part B office, compared with only 9 of 13 (69 percent) Comparison families. (The county this project served requires that parents make the initial referral.) With the support of EHS staff, more program families persisted through the process so that a greater proportion of their children were evaluated and found eligible for services (see Table 1). The four Comparison families who obtained services had young children with complex medical issues, three of whom were already receiving early intervention services at the time of application to EHS. The EHS children represented a wider range of types of disabilities and severity levels, suggesting that involvement in EHS might empower families to become aware of their children's developmental challenges and obtain services for developmental delays, not just for medically related disabilities.

TABLE 1
TRACKING EHS AND COMPARISON FAMILIES ON A CONTINUUM FOR EARLY INTERVENTION SERVICES

Group	Notification of Need	Parent Referral*	Evaluation Obtained*	Child Found Eligible*	IFSP or IEP Developed+	Services Initiated+
Program	19	18 (94%)	17 (89%)	15 (79%)	15 (100%)	13 (87%)
Comparison	13	7 (54%)	6 (46%)	4 (31%)	4 (100%)	4 (100%)

*% of total notified
+% of total found eligible

In the second study, researchers analyzed four of the 32 case studies to determine how EHS service providers supported families to secure early intervention services and address barriers to improving their children's lives. We selected these four cases for the diverse situations they present. When these families exited the program, we conducted additional interviews with their EHS staff to document the (a) extent to which children and their families had progressed and (b) ways in which EHS staff had worked with them. We analyzed interview transcripts and program and research records to create and revise categories of family characteristics, family needs and changes in needs, and EHS action in conjunction with the family. From the categories, we identified common themes and exceptions. We used the constant-comparative qualitative method to assess trends across cases (Glaser & Strauss, 1967).

Our analyses indicate that EHS staff actions were highly individualized to match each family's needs. Nevertheless certain patterns emerged from their approaches. EHS staff always started by meeting the parents where they were in terms of their priorities. They recognized that, although their primary mission was the welfare of the focus child, low-income families might experience multiple barriers to addressing an individual child's developmental issues over an entire family's urgent shared needs. As they began to work with the focus child, they simultaneously earned trust and established relationships with the parents by assisting with problem solving and resource identification to address the basic family needs. With a foundation in this relationship, EHS staff were then able to help parents focus on the less familiar challenges central to their children's development. In different ways according to parents' abilities and emotions, EHS staff helped parents understand child development, recognize and accept their children's unique challenges, comprehend that early intervention services might have something to offer and learn how to navigate the complex early intervention system.

The model that was the basis for EHS staff interactions with families oriented toward developing family problem solving skills. The goal was to provide information and scaffold steps in problem solving so that parents would internalize steps and apply them independently to solve future problems during the EHS years and thereafter. The method promoted action and reflection, so that families identified goals, developed plans, took action, and evaluated their progress.

Typically, EHS staff implemented one of two flexible service models: weekly home visiting or case management with EHS subsidized and supervised child care. In both, the individualized ways in which EHS staff supported different families seems illustrative of Vygotsky's theory of sociocultural development (Vygotsky, 1978): EHS home visitors and case managers determined where the parents' understanding or skills were, where they might be with assistance (zone of proximal development) and what specific supports it would take to help them grow. Staff then provided information and assistance incrementally, scaffolding on the knowledge and skills parents developed from one home visit or case management meeting to the next. The four cases illustrate scaffolding in both service models.

Following are summaries of each case to illustrate how EHS staff supported families:

Information Sharing

The Martinez family is comprised of a mother and father, both immigrants from South America, a 16-year-old son from the father's first marriage, an 11-year-old son, and a daughter who was 7 months old when the family enrolled in EHS services. The mother came to the USA in late adolescence when she was working for a diplomatic family; she learned English from watching TV. The father completed high school and attended technical school in South America, however, since emigration has had difficulty learning enough English to pass the citizenship test. His limited fluency is a barrier to improving his career prospects, and it forces him to rely on his wife for much of his communication.

When the couple's young daughter, the EHS focus child, was born, the father insisted that his wife quit her better paying job to care for the child. Although the mother agreed, this led to the family relying solely on the father's limited income from restaurant work. By the time they came to EHS, they had been through bankruptcy and lost their home. The five of them were living in a tiny one-bedroom apartment leased in a friend's name; they could afford only one meal a day. The parents' efforts to keep the children quiet and restrict their movement, to deflect attention from the presence of so many people in a small apartment, probably contributed to the daughter's delayed motor development. The child might also have been at risk due to the mother's complicated pregnancy, a history of ear infections, inadequate diet, and eating problems. Subsequent evaluations revealed delays in growth, gross motor skills, speech-language and social and emotional development.

The EHS home visitor, a native Spanish speaker herself, established a bond with both mother and father from the outset. She encouraged the reticent mother, who had "never let her tears run," to talk about the family's difficult situation. She helped both parents see other options for solving the child's and the family's problems. Subsidized family child care might afford their daughter the social and emotional stimulation and play space to enhance her development, and the mother's returning to work might also help the family. Similarly, the father grew to accept his daughter's need for specialized care and his family's need for a second income.

EHS staff educated and supported the parents across all areas of child rearing to address the daughter's health needs, alter the home environment to provide parent-guided opportunities for gross motor development and assure more socializing experiences and encourage more speech. The mother was a bright and motivated learner, oriented toward improving her family's future. She said, "The advice of how to make some goals. That's what I really had help with from the home visitor. To have someone to motivate you and guide you is really important for me and as a family to move on. Having someone who is truly pushing you, like 'you can do it if you want to do it,' was really important." The mother also welcomed the oral and written information the EHS home visitor shared and that she later pursued through the library. This enabled the home visitor to scaffold on her growing mastery from visit to visit as the mother took advantage of the sessions to discuss what she had read, try out new approaches and get feedback. The father was also involved in encouraging the child's development but not to the same degree.

Encouraging collaboration with other key providers (medical, early intervention, child care) to enhance the little girl's services was another approach the EHS home visitor took as she supported the parents to communicate with experts to expand their knowledge and influence their practices, e.g., an EHS nutritional consultant and pediatricians. With the home visitor's encouragement, as the mother grew in confidence she overcame her hesitance to separate from her daughter. She gradually returned to work, starting as a substitute and then full-time childcare assistant for EHS. She has since gone on to earn her Child Development Associate credential and become a teacher.

Information sharing best describes the scaffolding method that worked to support this family. The mother, especially, understood the significance of the resources EHS was making available. Scaffolded information sharing became the foundation on which both parents built to become resourceful problem solvers on their daughter's and, gradually, the family's behalf. Information shared enabled the family to enhance their daughter's gross motor development so significantly that she was deemed ineligible for early intervention services (although she later received services for speech and language delay). Trust in information sharing led the father to collaborate with the family child care provider and the case manager to develop a plan to reduce the daughter's tantrums when he picked her up from child care. And, problem-solving skills developed through EHS interventions led the mother to suggest to their childcare provider that initiating a communication notebook might enhance provider-family collaboration.

Task Analysis And Incremental Achievements

The Ramos are a family of four: the father, trained in Central America as a teacher, who is 11 years older than the mother; the teenage mother, the US-born daughter of an immigrant from the same region, and two sons, 3 years old and 3 months old at enrollment in EHS. The mother left home at 14 to move in with and later marry the father; she dropped out of school (special education) in 8th grade. She had never held a job. The father is self-employed, and the family was able to meet basic subsistence needs financially. However, the mother reported financial need, due to the father's restriction on her use of funds rather than limited resources.

The EHS home visitor initially described the mother as a "moody, sensitive (17 year old) child" who was disorganized, unable to follow through consistently on a plan and so depressed and fearful she rarely left the house without her husband. She was unresponsive to her children, appeared to be emotionally insensitive to their needs, and lacked even basic knowledge about child development, nutrition, safety, and behavior management. In one early observation, the 3-

year-old was playing outside, unsupervised, with clothing insufficient for weather conditions, despite the fact that he recently had been diagnosed with pneumonia.

EHS assigned the family a Spanish-speaking home visitor. The mother attributes to this factor and the home visitor's weekly visits to the development of a relationship that allowed her to gain confidence in herself as a person and a mother:

> We both talked the same language. ...She helped me. She was kind of like a friend. She came here. I think that was the first friend I had. She helped me in a lot of stuff, how to train the kids. I didn't get to learn a lot of things with [my first child] than what I know with [my second]. Like toys. She teaching me about toys. What do they do, what do the kids learn with it, all those kinds of things. So I think I improved as a mother, too.

The home visitor reports that to meet the children's needs it was crucial to focus simultaneously on the mother's many personal issues. She also recognized that the mother learned best from concrete guidance through incremental steps because of her cognitive limitations. The father was initially involved in EHS activities as a "monitor." He refused to let the mother meet with the home visitor without his presence. In response, she elected to appeal to his self-image as a businessman and involve him in decision making, determining that this would help him support rather than undercut her work. Over time, as he came to trust the decisions they reached together, he absented himself from meetings. The home visitor kept him posted about her activities. According to the mother, he became more actively engaged in household and parenting tasks.

Initially, the mother and EHS home visitor worked together to achieve concrete objectives in home safety, nutrition, parenting, and services for the children, as the home visitor also focused on helping the mother feel competent as a mother. Task analysis and the achievement of small successes were the foundation for scaffolding toward more independent problem solving in this case. The home visitor broke long- and short-term goals into consecutive shorter-term tasks and sequenced her direct instruction and modeling to scaffold on the successful accomplishment of each preceding task. For example, she accompanied and instructed the mother in community settings until she was comfortable going out alone; she not only gave her printed information but read it aloud to her and when she gave her recipes for nutritious foods, she cooked them with her. As the home visitor perceived that the mother was capable of acting independently, she withdrew her direct support. Over time, they also addressed communication skills, self-esteem, organizational skills, family roles and responsibilities, and ways to increase the mother's financial and emotional independence (e.g., driver's license, employment).

By the time the family "graduated" from EHS, the mother had a job that provided medical insurance for the entire family, held a driver's license, had begun developing a network of friends and was managing work and household chores. The problem solving skills nurtured by the EHS home visitor's task analysis and the mother's scaffolded achievement of concrete, incremental objectives led her to recognize her youngest son's need for special assistance and, despite the father's initial opposition, pursue Child Find to secure special education services. The mother had become proactively child focused, independent, more able to solve problems, and oriented toward the future.

Teaching by Modeling

The Velasquez family is a married couple living with two children, a daughter (2. 9 years old) and an infant son (3 months old) at the time of application. The mother was a homemaker who babysat, and the father worked one full- and one part-time job. The family owns its own home. The mother was raised by relatives who have said little about her childhood, resulting in her knowing little about any developmental issues she might have experienced. As a young adult she provided child care for families that led her to the USA. The mother remains unhappy with her limited English speaking, reading and writing skills, and her inability to earn a driver's license. The father emigrated at 15 to find work. He now speaks, reads, and writes English well.

When the family first began receiving EHS services, the home visitor noted that the mother was not fully engaged; she seemed "preoccupied." Once the home visitor learned it was due to worries about the $10,000 hospital bill for the infant's delivery, she resolved the issue by assisting the family to establish Medicaid eligibility. This bolstered her credibility and cemented her working relationship with both parents. She then focused most intensely on increasing child development knowledge and parenting skills: safety, nutrition, infant stimulation, anticipation of infant and toddler needs, speech and language development, motor development, play and socialization, behavior management, self-control and discipline.

Initially the home visitor saw the mother as highly stressed: "she was screaming, and she did not call her children with a voice that was appropriate." Over the course of service, the parents' growth in the program received high ratings. To work effectively with the parents, the Spanish-speaking home visitor assumed the role of teacher, identifying goals with the parents, then "talking with examples." For every visit she developed a lesson plan centered on child development and parenting topics – fine and gross motor work, communication and language skills, socialization or behavior – and modeled activities to meet their goals using songs, games, play, books, puzzles, painting and coloring, sound and word repetition. The mother observed, then she and the home visitor practiced. Each lesson scaffolded on the previous week's to stimulate, strengthen and reinforce the mother's and the son's skill development. When behavior and discipline were an issue, the home visitor modeled a calm voice and demeanor as the effective response. When the home visitor asked the father to be present, he followed his wife's lead, observing and following the EHS home visitor's example to learn to become more involved in the children's daily routine, especially by reading to them. When the mother introduced the idea of developing her own business as a licensed family child care provider, the home visitor added that to her lesson plans. She modeled how to run a child care program by selecting a variety of child development activities and teaching the mother how to use them with her own children. She also taught the parents about the importance of structure, routines, choices, discipline, health, safety, and nutrition for the child care setting.

Also critical was the EHS home visitor's flexibility. Although she had come to view the mother as highly involved and "open" to learning, she had her own ideas about how to handle her son's language problems other than the formal early intervention route suggested by EHS. Low scores on the Denver and multiple Bayley tests led the home visitor to focus on referral, evaluation and services for language and communication skills; however, the family chose not to enroll their son, even though he was found eligible. Instead, the mother "called a meeting" with immediate and extended family living in the home, explained the language concerns, began sharing with them the skill development strategies she was learning from the home visitor and asked them all to get involved. The home visitor in turn supported this new direction. She began a systematic program to help the family prompt language development. The family continued its efforts even during an extended visit to their native country. Thus, while the parents opted out of early intervention services, they did apply their home-based EHS lessons toward child development goals. The family push had an effect: when Child Find appealed the family's refusal of services, the re-evaluation found enough improvement that the boy was no longer eligible. A year later, when attention shifted to managing the son's aggressive behavior, discipline and toilet training, disappointment with Child Find's finding of ineligibility led them not to appeal the decision but to pursue further evaluation at a hospital where they had a positive experience with their daughter's care.

Teaching by modeling and a flexible approach that adapts to new or changing goals proved to be the support strategies that worked best to guide the Velasquez family successfully through their EHS experience. By the time their direct support came to a close, they had begun to reflect on their experiences and tested their problem solving skills to treat their daughter's health problems, resolve the son's speech and language and evaluate his social and behavioral performance, develop differential child development knowledge and parenting skills, transition both children to Head Start Programs, resolve the family debt, access health insurance and launch the mother as an EHS-approved, licensed child care provider.

Learning by Doing

The Smithsons are a U.S. born Caucasian family of four: two young children (4-year-old son and 2-year 9-month-old daughter at enrollment); the mother, who has a severe medical problem that can limit her ability to care for her children and affects her memory, and the father, the family's sole source of income, who has not graduated from high school and has trouble holding a steady job. At enrollment, the mother's health was poor, the family had no regular source of income or health insurance, and they lived in a small apartment they were able to rent only by using someone else's name to meet the income requirements. The Smithsons are the only one of our four cases that was assigned to child care and a case manager from the outset. Much of the EHS staff's work centered on helping them learn to work the various systems that might improve their children's lives.

In response to the children's immediate needs, the case manager convinced the family to arrange free child care through EHS due to the danger the mother's recurring medical problems posed for the children's well being. She also supported the mother to expand her understanding of her maternal role beyond the simple physical care of her children. As the mother's knowledge increased, the case manager responded by encouraging her to expand her role to manage more proactively the children's nutrition and television viewing (i.e., decreasing exposure and violent content) and augment their opportunities for physical play and parent-child activities. The father also learned to be more involved with the children and supervise their television viewing.

Simultaneously, the EHS case manager guided the parents to manage their finances better and understand the resources and systems available to them. For example, the parents had been using credit cards to pay medical bills rather than taking advantage of free medical services available through their county, and they had failed to sign up for company health insurance when the father got a new job, because they did not understand the requisite deadlines and documentation. The EHS case manager researched and informed the family about the steps to take to subscribe to the health plan. She also accompanied them to an initial meeting with a multi-agency team that promised assistance with reducing their burdensome credit card debt.

From the outset, the mother responded well to the EHS case manager's nonjudgmental approach. "A lot of stuff they talk to you about, you know ... [using] these terms [and] you are, like, okay, what language are you speaking? And, she'll [the case manager] translate, and she'll help me [by saying] 'Let's get that going.' ... She keeps me on top of things." Because she was aware of her son's problems with physical aggression, especially toward his younger sister, she was open to the suggestion to contact Child Find. The father was defensive and resistant to the notion that one of his children might have some limitations, but he accompanied his wife and the EHS case manager to the Child Find meeting. Behind the scenes, the case manager helped Child Find staff frame their explanation of the son's problems and their recommendations so that the father could accept the fact of his child's difficulties and need for intervention. The case manager and the EHS supervisor for child care similarly scaffolded evidence to help the parents learn to differentiate between high quality and inferior child care and come to terms with the need to change child care placement when the initial arrangement deteriorated.

Learning by doing is an effective description of this family, especially the mother, as an EHS participant. The parents learned what to look for in child care from a bad experience. Scaffolding on what she had learned from her son's developmental delays and behavior issues, the mother herself recognized her daughter's developmental difference as she neared age three and alerted EHS staff about her concerns. Although they requested some assistance with the Child Find process, this time the mother worked through the appointments much more independently. And, when a problem arose with their apartment management company over the size of their unit for a family with mixed gender children, using resources the EHS case manager only suggested, the mother followed through to negotiate a resolution on her own. The family had begun to generalize the problem solving skills they learned as a result of EHS support.

Conclusion

The first study indicates that virtually all of the EHS families made referrals whereas only two thirds of comparison families did. EHS then showed greater retention with most completing the evaluation process, whereas only half of the comparison families completed this step. Similarly, a majority of EHS families were eligible for services and received them, as compared with only one-third of the Comparison families.

The second study illustrates critical features of the challenges faced by EHS workers in supporting families when their young children need or are suspected of needing early intervention. Prominent is the fact that these families faced multiple risks, which had direct or potential impact on child development. Families lacked the knowledge, skills, confidence, or resources to know how to diminish these risks at first contact. The "educated eyes" of EHS workers recognized the children's needs and that the family's status had direct bearing on child development. By establishing a valued professional relationship, including good communication that matched languages of parents and EHS workers, EHS provided interrelated support to families that keyed into their children's development and still guided them to meet pressing basic needs.

Another striking aspect from the four cases is the unfamiliarity and difficulty of working the components of early intervention system for the low-income families. Between their own complex situations and the difficulty of working the system, it became apparent why low-income families are underrepresented among those obtaining early intervention services nationally and why professional support by EHS is necessary. EHS workers individualized their support as they helped each family learn about and accept their children's developmental status and negotiate early intervention and other systems.

The cases highlight four styles by which families learned to solve problems with EHS scaffolding–learning by doing, information sharing, task analysis and incremental achievements, and modeling–and conscious instruction in the use of problem solving processes. They are illustrative, not exhaustive, of how EHS works and describe how EHS services can facilitate each family's learning to solve problems systematically to enhance child and family development and independence.

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